

Journal

OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

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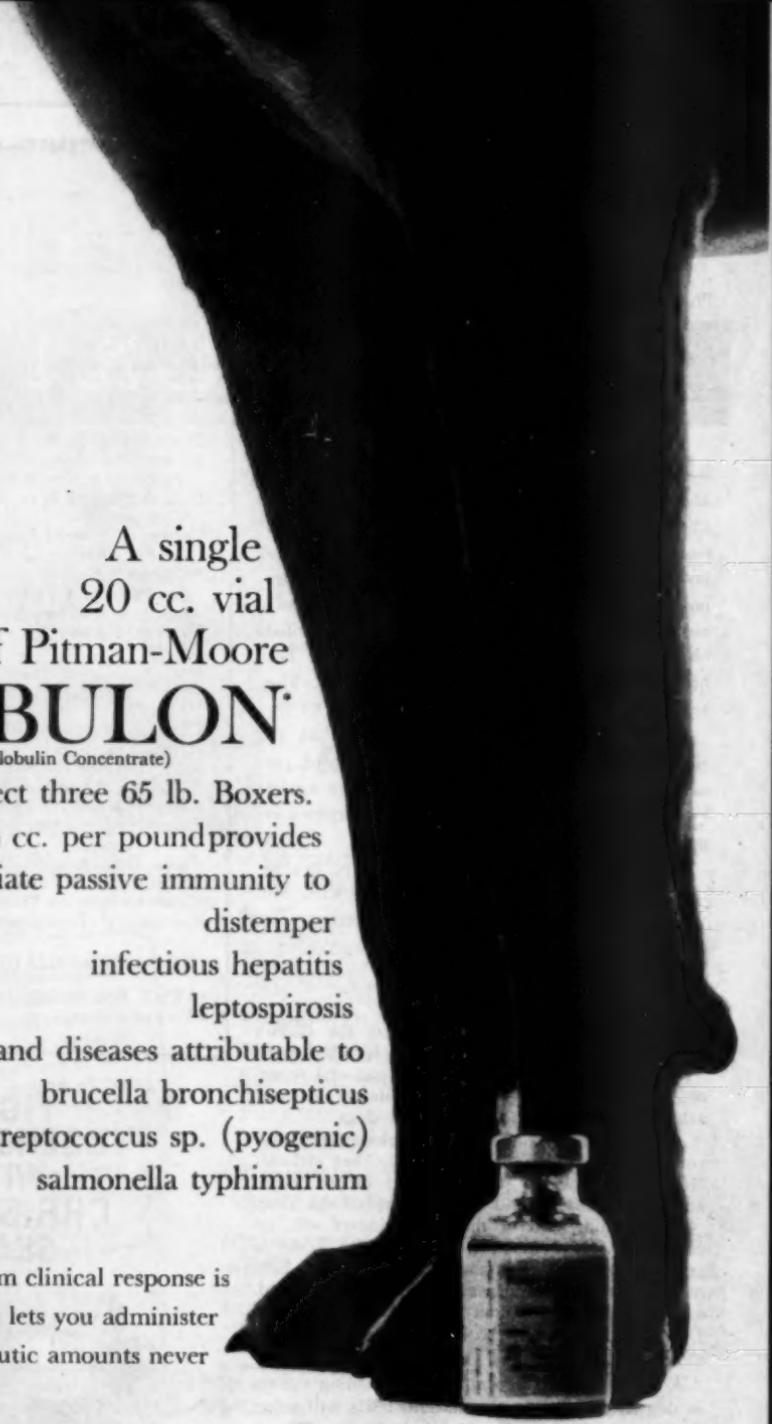
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Correspondence

Sir:

Permit me to compliment Dr. J. E. Croshaw, Philadelphia, for his excellent report on the occurrence of bilateral corneal dermoid in a calf (*J.A.V.M.A.*, 135, Aug. 15, 1959: 216). Field evidence accumulating during the past few decades indicates that bovine corneal dermoids have a hereditary background.

Personal conversations with Dr. George Fowler, former head of surgery, College of Veterinary Medicine, Iowa State University, and Dr. E. F. Ebert, Director of Clinics at the College of Veterinary Medicine, University of Missouri, strengthen my own observations that postnatal corneal dermoids are specifically related to certain family blood lines in cattle. They are possibly more often observed in Shorthorns than in the other beef breeds but Herefords rank a close second. They seem less prone to occur in dairy calves.

Our belief in the hereditary rather than the simple congenital etiological background of corneal dermoids has prompted us to advise against keeping affected calves for breeding purposes regardless of sex.

s/A. H. QUIN, D.V.M.
Kansas City, Mo.

★ ★ ★

Time to Send in Gaines' Youth Award Nominations

For the eleventh consecutive year the Gaines Dog Research Center, New York, is offering its "Youth Awards" in order to give national recognition to youngsters who have shown unusual achievement in raising or training dogs.

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A panel of judges composed of leading figures in dog shows, obedience and field trials will select the winners. Previous nominations for the "Youth Award" does not disqualify nominees providing they are still within the age limit and have been among the past winners.

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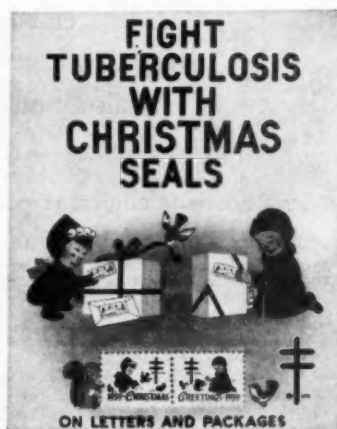
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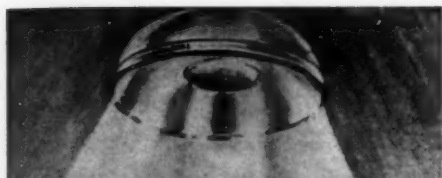
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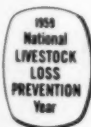
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REFERENCES: 1. Mosier, J. E., and Coles, E. H.: *Vet. Med.* 53:649 (Dec.) 1958. 2. Belloff, G. B.: *Calif. Vet.* 9:27 (Sept.-Oct.) 1956. 3. Mosier, J. E.: *Vet. Med.* 52:445 (Sept.) 1957.

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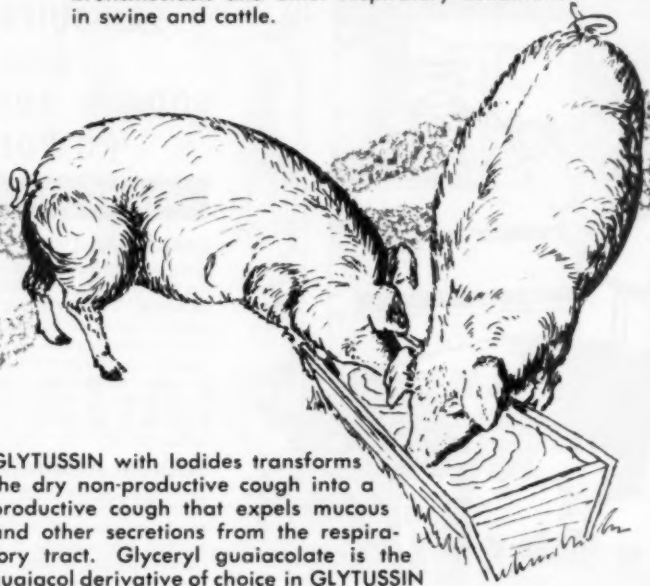
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1. Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: *Vet. Med.* 51:413 (Sept.) 1956.

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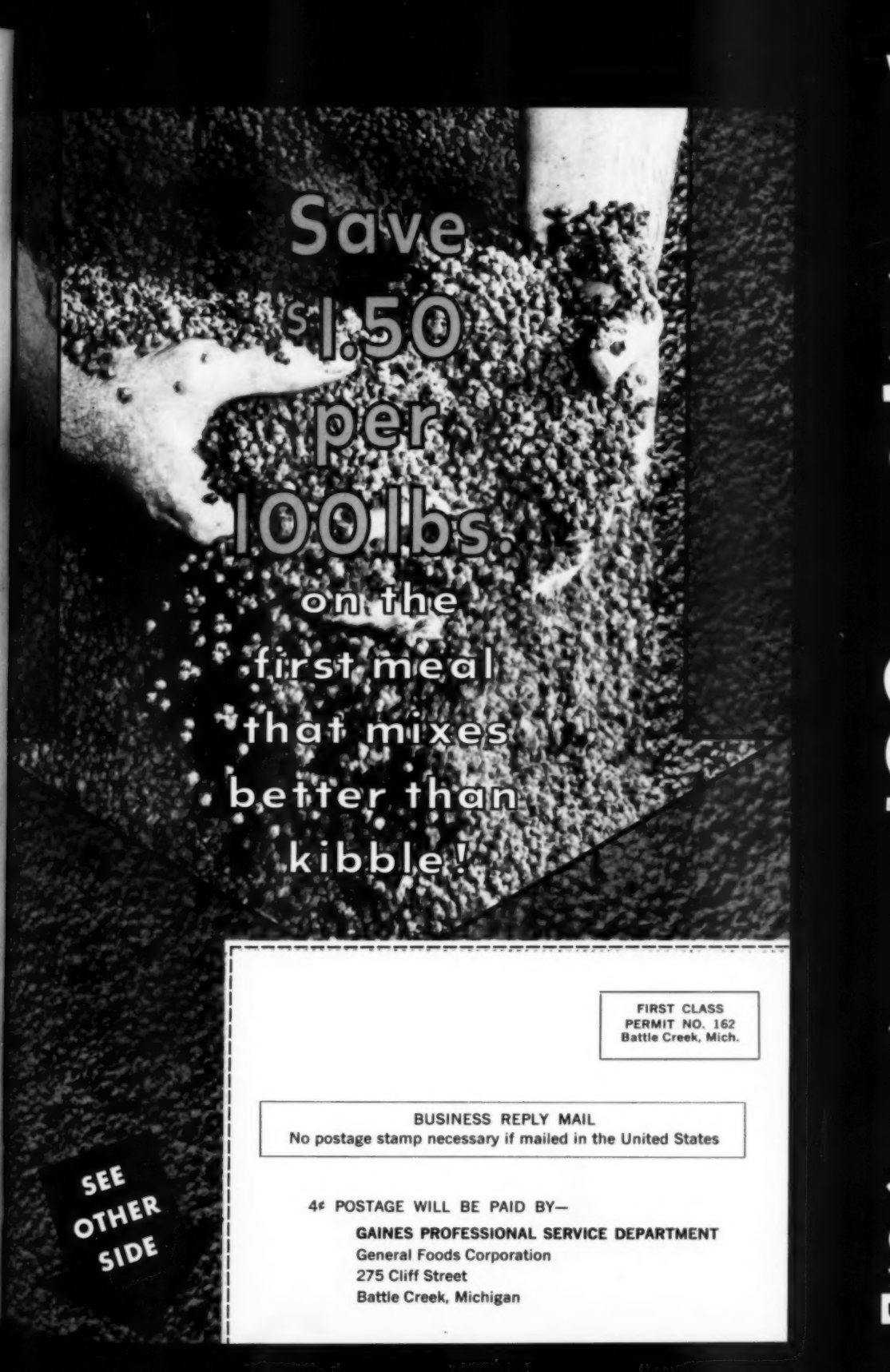
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BILLS BECOME PUBLIC LAW

86-209, August 29, 1959 (H.R. 6288), establishes a National Medal of Science to provide recognition for individuals making outstanding contributions to physical, biological, mathematical, and engineering science.

86-232, Sept. 8, 1959 (H.R. 8284), amends National Science Foundation as amended. Includes amendments pertaining to scientific research support, scholarships and fellowships, and cooperation in international scientific activities.

86-234, Sept. 8, 1959 (H.R. 2725), pertains to methods of hunting wild horses (see JOURNAL, Sept. 15, 1959, adv. p. 16).

BILLS CLEARED FOR THE PRESIDENT

Government Employees Health Benefits program, S. 2162, following House agreement to Senate amendments to House amendments, Sept. 14, 1959 (see JOURNAL, Oct. 1, 1959, adv. p. 22).

To extend for two additional years the authority of Surgeon General, P.H.S. with respect to air pollution control, H.R. 7476.

Extend the Agricultural Trade Development and Assistance Act of 1954, H.R. 8609, following adoption of conference report Sept. 11.

NEW BILLS

Federal and State Meat Inspection

H.R. 8951, H.R. 8954, H.R. 9187, by Representatives Hagen (D., Calif.), Horan (R., Wash.), Teague (D., Calif.), respectively. Identical bills to permit Department of Agriculture to cooperate with meat inspection service of the various states.

Chemical Additives

H.R. 9150, Rep. King (D., Utah), to establish a commission to conduct scientific study and investigation to determine effects on public health of added chemicals to water supplies and food products. Identical with H.R. 9191, Rep. Wolf (D., Iowa).

Water Pollution

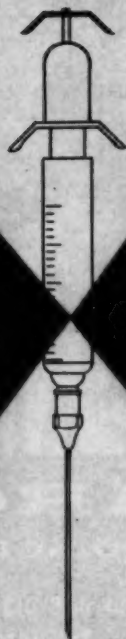
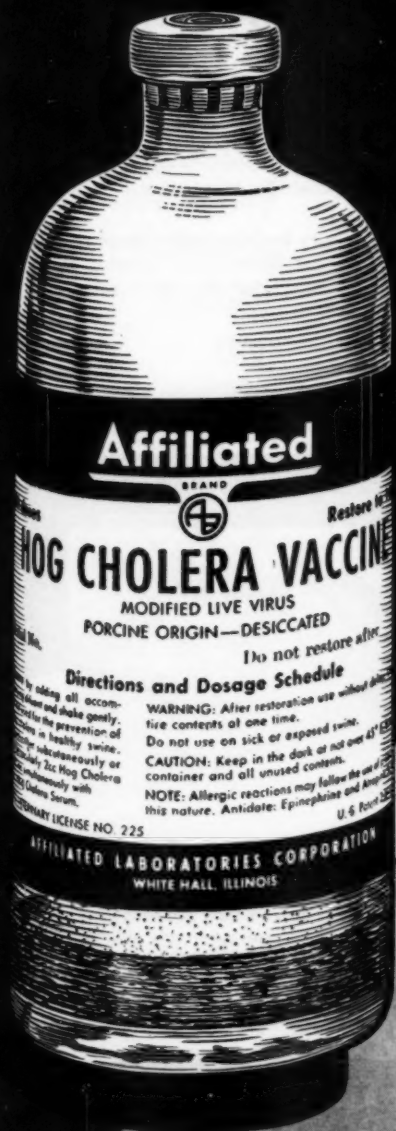
H.J. Res. 522, Rep. Reuss (D., Wis.), directing the secretary of H.E.W. to conduct studies and investigations relating to water pollution, would include sewage treatment and disposal, dumping oil wastes, nuclear wastes, and garbage from ships.

Fluoride in Water

H.J. Res. 523, Rep. King (D., Utah), to prohibit officers and federal employees from treating communal water supplies with fluoride compounds until Commission on Food and Water Contamination submits reports to the Congress. Identical to H. J. Res. 528, Rep. Wolf (D., Iowa).

(Continued on adv. p. 24)

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WASHINGTON NEWS—Continued

Review of Federal Income Tax System

House Ways and Means Committee will review and study the federal income tax system. Public hearings in the form of panel discussions will begin November 16. Panels will consist of tax experts from the professions, business, labor, agriculture, research organizations, colleges, and universities, who will be invited to participate. Chairman Mills has emphasized this is the first phase of the committee's study on tax reform. The hearings are exploratory in character and are intended to determine practical possibilities of establishing a broader income tax base and lower rates.

COMMITTEE REPORTS FILED

House Reports 815, Research in C.B.R. (Chemical, Biological, and Radiological Warfare); 1053, Narcotics Manufacturing Act of 1960; 1179, Dissemination of Scientific Information; 1180, Scientific Manpower and Education—deficiencies in the tabulation and study of scientific manpower.

Note: A copy of any above may be obtained without charge by addressing House Document Room, U.S. Capitol Bldg., Washington 25, D.C. It is essential that the report requested be identified by House Report number.

+ + +

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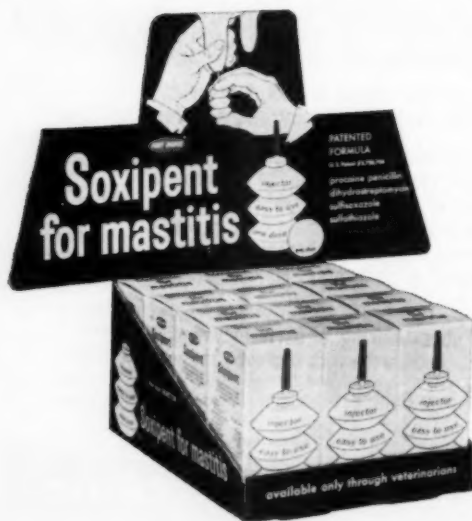
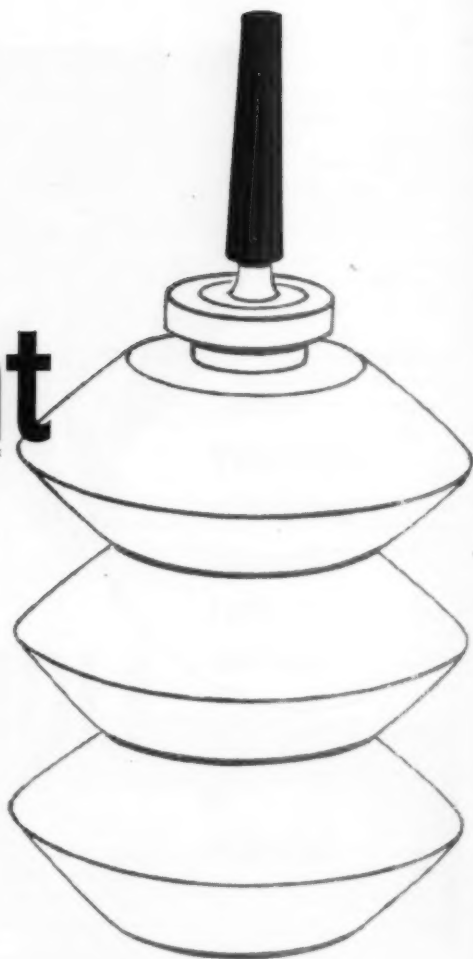
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The Production of Active Immunity Against the Canine Hookworm *Uncinaria stenocephala*

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A TECHNIQUE of vaccinating against helminth infections has been developed in which the vaccine consists of infective larvae which have been partially inactivated by x-irradiation.²⁻⁶ For example, the majority of x-irradiated *Dictyocaulus viviparus* larvae migrate no farther than the mesenteric lymph nodes. There they stimulate an immune response but cause no pathogenic effect. Using this principle, a practical field vaccine (Dictol*) has been produced to stimulate immunity against bovine parasitic bronchitis.

There is also a vaccine for use against infection by *Haemonchus contortus*, a parasite with a minimal migratory cycle.^{2,6} It was thought worthwhile to apply this technique to a species of canine hookworm. This paper records a successful experiment in vaccinating against *Uncinaria stenocephala*, the European hookworm.

MATERIALS AND METHODS

Thirty mongrel bitch pups, 8 to 12 weeks of age, were housed individually in wire-floored cages. A parasitological examination of their feces was made three times in three weeks before the start of the experiment to insure that they were not already infected with hookworms.

Feces containing hookworm eggs were obtained from naturally infected adults, and infective larvae were cultured in charcoal.⁹ A standard culture time of 12 days was adhered to at all stages of the experi-

ment. The technique of irradiation was as described previously.⁵

Fecal egg output was estimated in the experimental dogs by the McMaster technique and intestinal worm counts were made by washing out the intestinal contents at least one hour after the animal had been killed. The worm-containing fluid was made up to approximately 1 liter and all hookworms present were counted.

Tissues taken for histological examination were fixed in corrosive-formol, dehydrated in an alcohol-amy acetate-benzene series, and embedded in paraffin. Routine staining was by hematoxylin and eosin.

EXPERIMENTAL PROCEDURE AND RESULTS

Design of Experiment.—Each of 12 dogs was given 1,000 infective larvae which had been x-irradiated with 40,000 roentgens. All larvae were given by stomach tube. Six of these pups were to be killed at the time when eggs were first expected to appear in the feces in order to see if the irradiation had inactivated the larvae to such a degree as to prevent their maturing; 6 pups were allowed to survive in order to be exposed to a challenge infection. An enzootic of distemper occurred in the kennels during the experiment and 6 pups died of this virus disease 14 to 20 days after being given irradiated larvae; these served as larvae inactivation controls (group A1).

Twelve other pups were given 1,000 normal infective larvae from the same culture. Of these, 11 (group B1) died of distemper between the fourteenth and twentieth day after infection with hookworm larvae. These served as controls on the infectivity

*From the Department of Veterinary Medicine, University of Glasgow, Bearsden.

*Dictol, manufactured by Allen & Hanburys, Ltd., London. It is not yet available in this country.

TABLE 1—The Inactivating Effect of X Rays on Infective Larvae of *Uncinaria stenocephala* and the Immunogenicity of Irradiated Larvae

Group	Dogs (No.)	Treatment	Worms (mean No.) 14-20 days	Challenge 128 days	Worms (mean No.) after challenge 150 days
A (1)	6	1,000 larvae x 40,000 roentgens	130	-----	-----
(2)	6	1,000 larvae x 40,000 roentgens	-----	1,000 normal larvae	32
B (1)	11	1,000 normal larvae	746	-----	-----
(2)	1	1,000 normal larvae	-----	1,000 normal larvae	186
C Control	6	-----	-----	1,000 normal larvae	530

of the larvae. The remaining animal was kept and was challenged on the 128th day along with the vaccinated animals.

Six pups (group C) were left uninfected until day 128 when they were infected with 1,000 normal larvae as a control on the infectivity of the larval culture used to challenge the vaccinated pups. The design of the experiment is summarized in table 1.

Parasitological Results.—The vaccinated pups in group A1 died between 14 and 20 days after infection; intestinal worm counts were made. The group mean was 130 ± 29 (table 1). The corresponding control group (B1) had a mean worm count of 746 ± 32 . This difference is statistically significant but interpretation of the results is difficult because of the possible effects of the concomitant virus infection. The remaining vaccinated pups (group A2)

were challenged with 1,000 normal larvae on day 128 and were killed on day 150; the group mean worm burden was 32 ± 12.5 . The corresponding figure for the controls (group C) was 530 ± 100 . Again there is a significant difference, showing that the previous exposure to x-irradiated larvae had stimulated an immunity to reinfection.

The mean group fecal egg counts in the various groups are shown (fig. 1). The highest mean level reached after vaccination (group A2) was 150 eggs per gram while the control groups B1 and C reached heights of 34,000 and 18,000 eggs per gram, respectively.

The single animal comprising group B2 showed the effect of a double infection with normal larvae. After the first dose, the fecal egg output reached 20,000 per gram on the thirtieth day and became negative on day 95. When challenged, the count rose

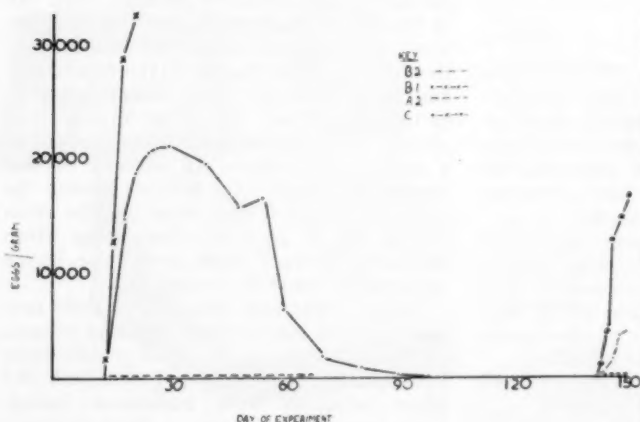


Fig. 1—Mean group fecal egg counts in dogs infected with normal and x-irradiated hookworm larvae.

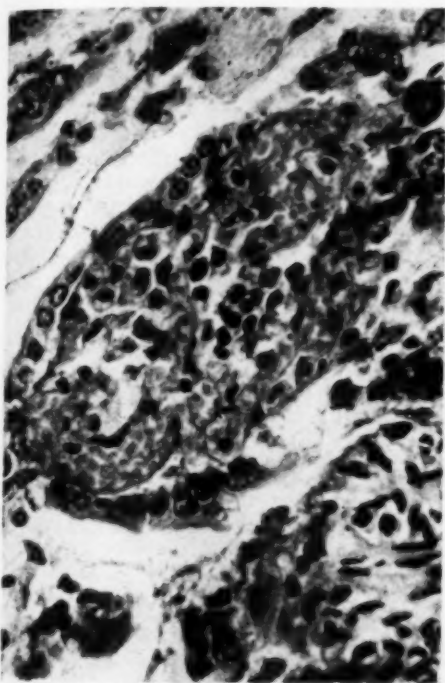


Fig. 2.—In pups given normal larvae there was dilatation and varicosity of the capillaries of intestinal villi. H & E stain; $\times 420$.

to 4,000 fecal eggs per gram and at necropsy the intestine contained 186 adult worms.

Pathological Results.—Gross and microscopic changes were observed.

Gross Observations.—The intestines of the pups infected with normal larvae (groups B1 and C) contained a reduced amount of fluid feces which were sometimes blood-tinged. The mucosa from the duodenum to the ileum was studded with punctiform hemorrhages, the highest concentration being in the upper half of the intestine.

The changes in the vaccinated pups of group A1 were similar but fewer hemorrhages were present. In the animals in group A2, there were almost no lesions visible.

Microscopic Changes.—In the pups which were given normal larvae (groups B1 and C), the most prominent lesions in the intestines were vascular. Apart from the generalized intestinal congestion, the

subepithelial capillaries of the villi were intensely dilated and varicose (fig. 2); thrombosis was common and was associated with necrosis of the villi and with superficial hemorrhage. Extravasation of blood was uncommon in the lamina propria of the villi but was found frequently in the crypt region where an even greater degree of capillary thrombosis and necrosis was evident. The adult hookworms lay between the villi with their heads in the crypt openings.

One section (fig. 3) shows the method of attachment and feeding; a hookworm lies in a crypt and has drawn a plug of epithelium and stroma into the buccal capsule. Multiple necrotic tracts, which almost certainly arose by worm penetration, can be seen in the mucosa. In addition, some tracts appear to extend into the submucosa.

The lesions in the animals of group A1 were similar to those described in groups B1 and C but were fewer in number.

A quite different series of changes was

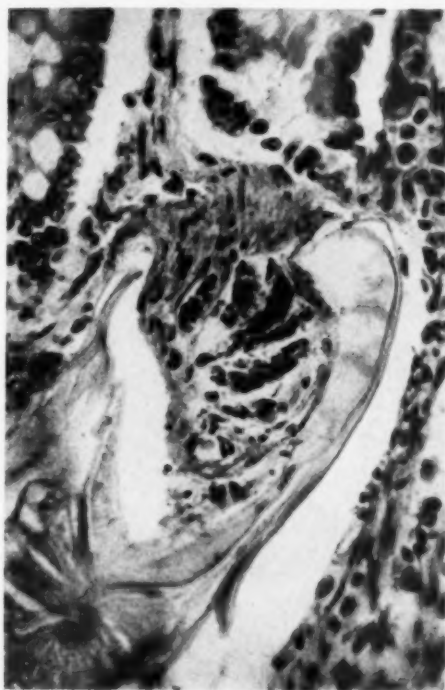


Fig. 3.—Section of intestine of a pup given normal larvae; a hookworm lies in a crypt and has drawn a plug of intestinal epithelium and stroma in its buccal cavity. H & E stain; $\times 420$.

seen in the pups which were subjected to challenge. Vascular and necrotic changes were not prominent, the main lesions being reactive in nature. Where necrotic tracts occurred, they were filled with eosinophil leukocytes and macrophages and not cellular debris. The submucosa contained a number of focal granulomata (fig. 4) which had centers of almost amorphous cell debris surrounded by a layer of macrophages interspersed with a varying number of eosinophils. These lesions were possibly reactions to the inhibited larvae, but no direct evidence of this was found in the sections studied. The solitary lymphoid nodules of the submucosa were markedly hyperplastic (fig. 5) and often involved the whole thickness of the mucosa.

DISCUSSION

These results show that an infection with *U. stenocephala* produces a degree of resistance to reinfection; in this respect it is similar to *Ancylostoma caninum*. Ir-

radiated larvae are also capable of giving rise to a marked immunity. The mechanism of production of this state cannot be deduced from this experiment. It has been shown¹ in *Trichinella spiralis* infection that irradiated larvae can give rise to a largely sterile adult population and it has been claimed that the subsequent development of immunity is dependent on this adult intestinal infection.

In these experiments, when *T. spiralis* larvae were irradiated so as to prevent the development of adult forms, no immunity resulted. However, more recent work shows that some immunity to *T. spiralis* can be obtained by administering larvae irradiated to such a degree as to prevent the development of an adult population.

It is probable that in *D. viviparus*^{2,3,6} and *H. contortus*² infections the adult phase is not necessary for the development of immunity. By covering a range of roentgen doses, it appeared that the effect of irradiation on these parasites was the

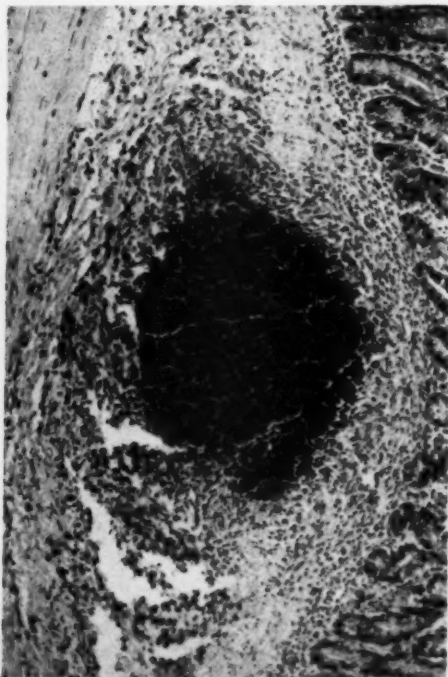


Fig. 4—Focal granuloma in the submucosa of the small intestine of a pup subjected to challenge after vaccination with irradiated infective larvae. H & E stain; x 110.

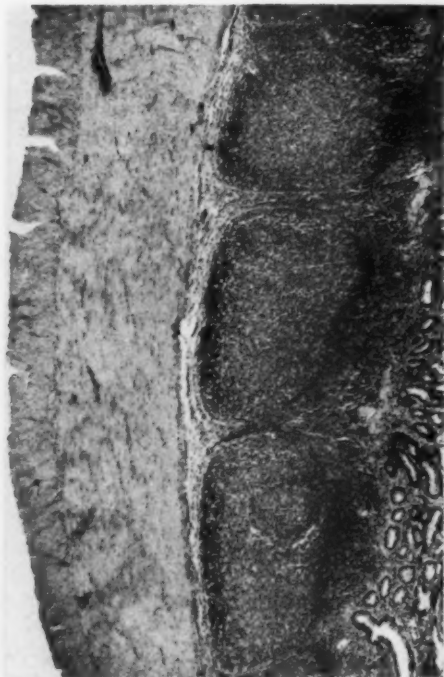


Fig. 5—Hyperplasia of the lymphoid follicles in the submucosa of the duodenum of a pup subjected to challenge after vaccination with irradiated infective larvae.

curtailing of the development of the larval stages.

Either of these mechanisms may operate in *U. stenocephala* infections. The dose of radiation used in this experiment did not partially inactivate all of the larvae and some developed to the adult stage. It is, therefore, impossible to be certain that the immunity was stimulated only by the inhibited larvae. On the other hand, the single pup which was reinfected with normal larvae (B2) did not show the same resistance as any of those previously given irradiated larvae; in this respect, *Uncinaria* may resemble *H. contortus*.² We have speculated that the reason for a given number of irradiated larvae producing a better immunity than the same number of normal larvae may be that the former are arrested in such a site as to enable them to exert an antigenic stimulus for a longer period than the normal migratory larvae. The presence of submucosal granulomata, possibly caused by larvae inhibited in migration in *Uncinaria* infections, may indicate that the mechanism of stimulation of immunity resembles that of *H. contortus* infections. The point cannot be settled until a range of roentgen doses is applied to hookworm larvae.

In bovine parasitic bronchitis, it has been shown that double vaccination with small numbers of irradiated larvae produces a higher level of immunity than single vaccination with four times the number of larvae.^{4,6} This is being applied to *Uncinaria* infections and, if successful, may provide a suitable method of field prophylaxis against hookworms.

SUMMARY

Pups were immunized against hookworm infections by vaccinating them with irradiated infective larvae. This is significant with respect to practical vaccination measures and to fundamental immunity problems in parasitic diseases.

References

- ¹Gould, S. E., Gomberg, H. J., Bethell, F. H., Gillela, J. B., and Hertz, C. S.: Studies on *Trichinella spiralis*. Am. J. Path., 31, (1955): 933-963.
- ²Jarrett, W. F. H., Jennings, F. W., McIntyre, W. I. M., Mulligan, W., and Sharp, N. C. C.: Studies on Immunity to *Haemonchus contortus* Infection—Vaccination of Sheep Using a Single Dose of X-Irradiated Larvae. Am. J. Vet. Res., 20, (1959): 527-531.
- ³Jarrett, W. F. H., Jennings, F. W., McIntyre, W. I. M., Mulligan, W., Sharp, N. C. C., and Urquhart, G. M.: A Field Trial of a Parasitic Bronchitis Vaccine. Vet. Rec., 70, (1958): 451-454.
- ⁴Jarrett, W. F. H., Jennings, F. W., McIntyre, W. I. M., Mulligan, W., Sharp, N. C. C., and Urquhart, G. M.: Immunological Studies on *Dictyocaulus viviparus* Infection in Calves—Double Vaccination with Irradiated Larvae. Am. J. Vet. Res., 20, (1959): 522-526.
- ⁵Jarrett, W. F. H., Jennings, F. W., McIntyre, W. I. M., Mulligan, W., and Urquhart, G. M.: Immunological Studies on *Dictyocaulus viviparus* Infection. The Immunity Produced by the Administration of Irradiated Larvae. J. Immunol. (1959): In press.
- ⁶Jarrett, W. F. H., Jennings, F. W., McIntyre, W. I. M., Mulligan, W., and Urquhart, G. M.: Irradiated Helminth Larvae in Vaccination. Proc. Roy. Soc. Med., 51, (1958): 743-744.
- ⁷Jarrett, W. F. H., Jennings, F. W., McIntyre, W. I. M., Mulligan, W., and Urquhart, G. M.: The Natural History of Parasitic Bronchitis with Notes on Prophylaxis and Treatment. Vet. Rec., 69, (1957): 1329-1337.
- ⁸Larsh, J. E., Race, G. T., and Goulson, H. T.: Histopathologic Study of Mice Immunized with Irradiated Larvae of *Trichinella spiralis*. J. Infect. Dis., 104, (1959): 156-163.
- ⁹Scott, J. A.: An Experimental Study of the Development of *Ancylostoma caninum* in Normal and Abnormal Hosts. Am. J. Hyg., 8, (1928): 158-204.

Chronic Penicillin Urticaria from Dairy Products

Traces of penicillin in dairy products have previously been suspected but never proved as a cause of allergic reactions. Proof of allergenicity of penicillin in dairy products in four patients was based on the following evidence: patients had previous allergic reactions to penicillin; this reaction was duplicated repeatedly after ingestion of dairy products; the reaction cleared rapidly after injection of penicillinase; the patients could eat dairy products without subsequent allergic reactions if given a prophylactic injection of penicillinase.

Even more stringent efforts should be made to eliminate penicillin contamination of milk.

Patients with chronic urticaria should be given a test injection of penicillinase if penicillin sensitivity is suspected. If urticaria clears for four to seven days, penicillin sensitivity was probably the cause.

Patients with chronic urticaria, where penicillin sensitivity is proved or suspected, should not eat dairy products, ice cream, and Roquefort or bleu cheeses containing Penicillium species molds.—M. C. Zimmerman, M.D., in A.M.A. Arch. of Dermat. (Jan., 1959): 5.

A Qualitative Sulfobromophthalein Sodium Retention Test of Liver Function in the Horse

H. C. MORGAN, D.V.M., M.S.

Auburn, Alabama

THERE HAS BEEN A NEED for a reliable test of liver function in the horse. The icterus index determination has been widely used, but is usually unsatisfactory. Several sulfobromophthalein sodium (Bromsulphalein,* BSP) methods have been suggested,^{1,2,7} but each one has disadvantages. The most common disadvantage is difficulty in obtaining accurate body weights for some methods. A clearance method has been suggested² to bypass the weight problem but is of questionable value. The BSP test developed in this research offers the veterinary practitioner a diagnostic tool which can be used with minimal regard for an animal's weight, and with reliable qualitative results.

DEVELOPMENT OF TEST METHOD

Initial Efforts.—A horse showing clinical signs suggestive of liver degeneration was brought to the large animal clinic. Since no description of testing in the horse was found, a test similar to that used in man and small animals was attempted. Another apparently normal horse, of approximately the same weight, was tested for comparative purposes.

The doses of BSP were calculated on the basis of estimated body weight (5 mg. per kg.) and injected in a jugular vein. Withdrawals were made from the opposite vein 15 and 30 minute later. Under the chemical evaluation method used, the normal horse showed no retention in either sample, while the horse suspected of having a liver dysfunction retained 20 per cent of the injected dye after 15 min. The 30-minute

withdrawal sample was negative for dye retention in both animals. These findings, as indicated by later work, are of questionable value as a quantitative retention test, but qualitatively they may have indicated liver damage. At necropsy, the horse was found to have cirrhosis of the liver (horse D, table 3).

Later, 9 clinically normal horses were tested by various BSP methods in an attempt to devise a satisfactory test (table 1). Problems encountered led to modifications. Initially, normal bilirubin content of the blood stream interfered with determination of the amount of retained BSP, but chemical analysis made allowances for bilirubin as well as hemolysis and turbidity.³ This method was used on the last 5 animals listed in table 1. Concurrently it was found⁴ that in dogs a chemical method⁶ was apparently as accurate but much simpler than the method previously mentioned. After comparison in horses, it was decided that the Popper and Schaffner modification⁶ would be used for all analyses because of its simplicity.

Both methods required knowledge of the horses' weight, and when this was estimated, there was concern as to the validity of results. One advantage of a proposed clearance test² was that it required a standard BSP dosage of 1 Gm. for all horses, regardless of size. A horse was given 1 Gm. of BSP, and seven days later a 2-Gm. dose. Little difference was detected between the clearance rates of these doses. This did not mean that the retention rates at any given time would be the same, but it did stimulate ideas for a standard dose for a retention test.

Experimental Method.—Plans were made to evaluate the disappearance rate of a standard dose of BSP, when injected into various sized horses, and to select the best time interval to be used in clinical determinations. To determine a standard dose, the average weight of the horses at the clinic was estimated to be 900 lb. The dose, calculated on the basis of 5 mg. per kilogram of body weight, would have been 2,045 mg., but 2,000 mg. (40 mg. of a 5% BSP) was used.

Dr. Morgan was assistant professor, Physiology Department, Alabama Polytechnic Institute, Auburn, at the time of this report. He is now a general practitioner in Murfreesboro, Tenn.

Published with the approval of the Committee on Publications of the School of Veterinary Medicine as paper No. 830.

The author thanks Drs. F. G. Schell and J. T. Vaughan of the Large Animal Clinic, A.P.I., for their assistance.

*Bromsulphalein is manufactured by Hynson, Westcott and Dunning, Inc., Baltimore, Md. Material for this study made available through the courtesy of Dr. J. H. Brewer. Bromsulphalein is available for veterinary use in packages of 3, 7, 10, and 20 ml.

TABLE 1—Initial Efforts Concerning Sulfobromophthalein Sodium (BSP) Retention Tests of Apparently Normal Horses

Horse No.	Estimated weight (lb.)	BSP injected (mg.)*	BSP retention postinjection (%)					
			5 min.	10 min.	15 min.	20 min.	25 min.	30 min.
1	750	1,700	—	—	4.0	—	—	0.0
2	875	2,000	20.0	12.0	4.0	0.0	—	0.0
3	750	1,700	28.0	7.0	5.0	2.0	—	0.0
4	650	1,450	21.0	5.0	1.0	0.0	—	0.0
5**	700	1,590	—	—	2.0	—	—	0.6
6**	850	1,930	25.9	12.4	9.9	—	—	—
7**	1,000	2,270	—	—	8.4	2.6	—	1.8
8**	800	1,815	—	—	3.4	3.4	—	3.1
9**	650	1,475	34.0	—	7.4	—	—	2.1

*Dosage based on estimated body weights; **method as described by Hawk et al.³

All BSP injections and blood withdrawals were made through polyethylene medical tubing** to insure accuracy. The inside diameter of the tubing allowed a 20-gauge needle to fit snugly inside. The tubing was placed in each jugular vein through 14-gauge needles, and the needles were removed. The 2-Gm. dose of BSP, using two 20-ml. syringes, was injected into the left jugular vein within one minute. The mean injection time was considered to be at the insertion of the second syringe. That tubing was then removed and discarded.

At exactly five minutes from the mean injection time and at five-minute intervals thereafter, a total of six withdrawals of blood was made from the opposite jugular vein. Withdrawal was started ten seconds prior to the five-minute interval and required 20 seconds for a mean withdrawal time near the exact time. Approximately 8 ml. of blood was obtained with each withdrawal. The tubing was then flushed with saline solution to assure that no residual dye remained at the next withdrawal. Heparin was used in all syringes, and was kept in the tube opening between withdrawals to prevent clotting. Following the final blood sample withdrawal, the tubing was removed.

**Polyethylene tubing—inside diameter, 0.034 inch and outside diameter, 0.050 inch.

Chemical Analysis.—The blood samples were centrifuged and 2 ml. of plasma analysed.⁶ To the 2 ml. of plasma, 8.0 ml. of 0.85 per cent saline solution was added and well mixed. To 5.0 ml. of the mixture, 0.2 ml. of 10 per cent sodium hydroxide solution was added to bring out the alkaline BSP color; 0.2 ml. of 10 per cent hydrochloric acid was added to the other 5.0 ml. to compensate for any hemolysis. Both samples were placed in individual cuvettes and read in a Coleman Universal Spectrophotometer† at a wavelength of 580 mμ, using the acid-treated sample as the blank. The readings were made in terms of optical density and compared to a previously prepared standard curve. Results from the standard curve were read as milligrams of dye per 100 ml. of plasma, and when multiplied by ten, gave the percentage of the total amount that had been injected. The method of Hawk et al.³ was used to establish the standard curve.

The "retention" figure obtained is not a true retention percentage except for a horse weighing 875 to 900 lb. However, since it is an attempt at simplification of the test, the familiar clinical term "retention figure" is used instead of "mg./100 ml." of plasma. Actually, both are approximations.

†Manufactured by Coleman Instruments, Inc., Maywood, Ill.

TABLE 2—Sulfobromophthalein Sodium (BSP) Retention Tests on Apparently Normal Horses Using a Standard Dosage*

Horse No.	Estimated weight (lb.)	BSP injected (mg.)	BSP retention postinjection (%)					
			5 min.	10 min.	15 min.	20 min.	25 min.	30 min.
10	900	2,000	24.6	10.3	4.9	3.0	2.2	1.7
11	1,100	2,000	26.2	14.9	3.7	3.5	1.8	1.2
12	850	2,000	38.7	12.7	7.1	4.7	3.6	2.9
13	850	2,000	53.8	23.4	11.6	8.3	6.3	1.4
14	1,150	2,000	27.5	9.8	7.3	5.0	4.9	3.5
15	850	2,000	69.9	15.1	12.7	9.6	8.5	7.7
16	1,150	2,000	19.3	11.2	8.3	6.5	5.5	4.1
17	1,000	2,000	41.4	15.3	6.8	5.0	4.2	4.1
18	900	2,000	55.7	23.2	9.1	7.9	6.2	5.8
19	900	2,000	34.8	7.8	4.8	2.2	1.3	1.3
20	700	2,000	35.2	13.0	5.0	4.3	1.1	1.0
21	900	2,000	21.2	6.5	3.0	1.6	1.0	0.9
Mean	937.5		37.35	13.6	7.02	5.13	3.88	2.96
Standard deviation			15.6	5.32	3.01	2.50	2.45	2.16
Error of mean			4.49	1.61	0.87	0.72	0.70	0.62

*Chemical method as described by Popper and Schaffner.⁶

Evaluation of Results.—During the experiment, results were recorded but no conclusions were drawn until results were compiled from 12 horses (table 2).

The percentage retention at the five-minute withdrawal time varied considerably between different animals. Attempts at correlation of these figures with the estimated weights showed that they were not always in agreement, although in most cases the heavier horse showed a lower percentage retention. The observations at ten minutes varied little from a mean of 13.6 per cent. The samples at the 15-minute interval showed a mean of 7 per cent, but some horses showed only traces of remaining dye. The rate of clearance was rapid during the first ten minutes but after that it was slow. It was decided that the 15-minute time interval would be used for testing and that 10 per cent retention would be the maximum percentage considered normal.

Horse 13 and 15 (the same animal) indicated greater than the recommended normal retentions. The reason for running two tests on this horse was to make certain that the results of the first test were not due to an error in technique. Weight should have been no problem, since its estimated weight of 850 lb. was near the weight for which a 2-Gm. dose would be given on a milligram per kilogram basis. Since this was the only horse that exceeded the 10 per cent margin in the total of more than 20 clinically normal horses that have now been tested, it was decided to regard this horse with "suspicion" and accept 10 per cent as the normal figure for 15 minutes.

CLINICAL APPLICATION

Test Method.—The same method as previously described was used except that polyethylene tubing was only used on the injection side and the 15-minute blood sample was the only withdrawal. Poly-

ethylene tubing is strongly recommended because of the slow injection rate required and the irritant qualities of BSP.

The method of chemical analysis was the same as previously described, or comparator blocks (Bromsulphalein Colorimeter†) may be used. Due to high serum bilirubin levels, the comparator block method is not as satisfactory. However, interference by the bilirubin is diminished by dilution of 1.0 ml. plasma with 4.0 ml. of 0.85 per cent saline solution. Three drops of 10 per cent sodium hydroxide is added to the mixture for comparison with standards and the results obtained are multiplied by 2.

Clinical Cases.—During a two-year period, horses with signs of liver dysfunction were tested upon entry at the clinic (table 3). The 3 clinically normal horses (A, B, and C) were used as controls.

Animal D, the horse which prompted initial BSP test efforts, was tested, along with horses E and F, before the standard dosage was determined. The results are considered significant, however, since all 3 animals exhibited high BSP retention even though they were given less than the present standard dosage. Confirmation of diagnosis was made on necropsy of animals D and F, but animal E was sent home at the owner's insistence.

Animal G had typical signs of cirrhosis of the liver but the negative BSP test prompted treatment for a possible obstruc-

†Bromsulphalein Colorimeter is manufactured by Hynson, Westcott and Dunning, Inc., Baltimore, Md.

TABLE 3—Clinical Use of the Qualitative Sulfobromophthalein Sodium (BSP) Retention Test Using a Standard Dose

Animal	Date of test	Estimated weight (lb.)	BSP Injected (mg.)	BSP retention postinjection (%)				Icterus index units*	Quant. serum bilirubin (mg./100 ml.)	Termination	Diagnosis
				5 min.	10 min.	15 min.	30 min.				
A	7-16-58	1,000	2,000	24.0	6.8	2.0	.....	6.0	.....	Normal	.....
B	8-11-58	1,200	2,000	21.4	4.8	1.5	.....	11.0	0.8	Normal	.....
C	9-6-58	750	2,000	44.4	13.0	4.5	.....	11.2	.....	Normal	.....
D	7-6-56	700	1,550	.....	.....	20.0	0.0	.....	7.4	Euthanasia	Cirrhosis
E*	5-6-57	800	1,800	.....	.....	32.0	14.8	.....	.....	Unknown	Cirrhosis
F*	7-5-57	850	1,930	.....	.....	49.0	26.0	.....	.....	Died	Cirrhosis
G	9-20-58	850	2,000	34.5	16.0	7.0	.....	.....	.....	Recovered	Obstruction
H	7-16-58	650	2,000	29.2	6.3	5.0	.....	.....	.....	.....	.....
	8-7-58	650	2,000	26.6	7.5	3.1	.....	.....	.....	.....	.....
	9-3-58	650	2,000	36.2	11.2	5.1	.....	.....	.....	Euthanasia	Wobblers
I	12-11-58	900	2,000	.....	.....	39.5	.....	19.0	.....	Died	Cirrhosis
J	7-30-58	350**	800	26.0	6.0	5.0	.....	.....	.....	Recovered	Vertigo
K	1-21-59	250**	550	.....	.....	30.5	.....	28.0	4.1†	.....	.....
	1-26-59	250**	550	.....	.....	32.5	.....	31.0	.....	.....	.....
	1-30-59	250**	550	.....	.....	37.7	.....	25.0	.....	Died	Impaction

*Method as described in Hawk, et al.; †Sherland pony—dosage: 5 mg./kg. of estimated body weight; ‡van den Bergh reaction was indirect.

tion. The animal appeared normal four days later.

In animal H, incoordination was prominent along with many signs of cirrhosis. Negative BSP findings supported a clinical diagnosis of wobbles. The animal was killed, and at necropsy the liver appeared normal.

Animal I showed incoordination, pushed against walls, foamed at the mouth, had a discharge from the nostrils, and showed some jaundice. A clinical diagnosis of toxic encephalitis was suggested. Necropsy findings of cirrhosis confirmed the BSP results.

Animal J was a Shetland Pony, so to allow for its small size, the dose was figured on the basis of 5 mg./per kilogram of estimated body weight. The pony had a history of incoordination for several weeks and at times almost fell. No cause for the incoordination was found and spontaneous recovery occurred in approximately six weeks.

Animal K, another pony, presented a long-standing history of signs typical of cirrhosis. The BSP results, along with icterus index and serum bilirubin findings, agreed with these signs. The van den Bergh reaction was indirect and the feces had a gray, putty-like consistency. On necropsy, the cause of death was found to be an impaction of the right dorsal colon, but this was considered of secondary importance.

Histopathologic findings in the liver showed central and midzonal fatty infiltration; therefore, the high BSP, icterus index, and serum bilirubin findings must be attributed to the obstruction. The indirect-acting van den Bergh test suggested a possibility that the liver was not being given ample opportunity to act on substances transported by the blood stream. Interference with circulation to the liver was not found but was suspected.

DISCUSSION

The retention test suggested as a result of this research admittedly has faults, but is designed to be a working tool for equine practitioners. The validity of results from giving a standard dose to all horses may be questioned, but are much more reliable than results from a dosage based on estimated weight if an error is made in that estimation. In using a standard dosage, little difference in retention is

noted at 15 minutes even though the weight may vary from 650 to 1,200 lb. On animals weighing less than 500 lb., it would probably be best to estimate their weight and inject BSP at the rate of 5 mg. per kilogram of estimated body weight. Only 2 ponies were tested and the estimation technique was used on both of them.

Anaphylactoid reactions occurred in 4 horses during the course of test development. Bacteriologic and clinical testing indicated that test solutions were contaminated with *Aerobacter aerogenes* which is believed to have been the etiologic agent. Only BSP solutions from freshly opened ampules should be used because of this danger. A complete description of the reactions and test methods will be presented in a separate paper.⁵

SUMMARY

A qualitative Bromsulphalein (BSP) retention test of liver function in the horse has been described. The test requires that a standard amount of BSP (40 ml. of a 5% solution) be given to all average-sized horses regardless of weight. It is recommended that polyethylene tubing be used for all injections. Only one blood withdrawal is necessary—15 minutes after BSP injection. Heparin should be used for withdrawal.

Normal BSP retention is less than 10 per cent after 15 minutes. A horse with a retention of 10 to 15 per cent should be considered suspicious.

Eight clinical cases are presented to show the usefulness of the test in differential diagnosis.

References

- ¹Aktan, Von F.: Die Leberfunktionsprüfung mit Bromthalein beim Pferde. *Monatsh. f. Vet.-med.*, 5, (1954): 97-101.
- ²Cornelius, Charles E., and Wheat, John D.: Bromsulphalein Clearance in the Horse—A Quantitative Liver Function Test. *Am. J. Vet. Res.*, 18, (April, 1957): 369-374.
- ³Hawk, P. B., Oser, B. L., and Summerson, W. H.: *Practical Physiological Chemistry*. 13th ed. Blakiston Co., Inc., N.Y. and Toronto, 1947.
- ⁴Morgan, H. C.: A Comparison of Uric Acid Determinations and Sulfobromophthalein Sodium Retention Tests as an Index to Canine Liver Dysfunction. *Am. J. Vet. Res.*, 20, (March, 1959): 372-377.
- ⁵Morgan, H. C., Attleberger, M. H., and Groth, A. H., Jr.: Anaphylactoid Reactions in Horses Following Administration of Contaminated Sulfobromophthalein Sodium Solutions. Unpublished data.
- ⁶Popper, Hans, and Schaffner, Fenton: Liver:

Structure and Function. McGraw-Hill Co., Inc., N.Y., 1957.

Proctor, D. L., and Zinn, R. D., veterinary practitioners, Lexington, Ky.: Personal communication, 1957.

Animal Breeding Abstracts

The following items were taken from *Animal Breeding Abstracts*, March, 1959.

Age, and the Rings on Horns of Cows.—The age of a cow can be calculated by adding the number of rings on her horns to her age, in years, when she first calved. A ring begins to form shortly after each calving.—*Item 59, p. 25.*

Birth Weight of Lambs.—Studies in South Africa, with several breeds of sheep, showed that twin individuals weighed 16.0 per cent less at birth than single lambs, and males weighed 5.1 per cent more at birth than females. No relationship was established between the sex of the fetus and the duration of pregnancy. Irrespective of breeding, the birth weight of single lambs was approximately 7.5 per cent of the average weight of both parents. The birth weight of single lambs gradually increased from the first to third lamb borne by each ewe.—*Item 263, p. 63.*

Crowding Delays Breeding of Mice.—When wild house mice were kept in crowded colonies, the vulvas of the females either failed to open or soon resealed. This was associated with inactivity of the ovaries and excessive fat deposits. The fertility of the males seemed unaffected. When these mice were then turned into a large pen, most females conceived within a week, indicating a self-regulatory mechanism which operates in high population densities.—*Item 424, p. 94.*

Reproductive Potential of Mice.—In both laboratory raised and captured female field mice (*Microtus arvalis*) puberty occurred at 10 to 12 days and mating after 13 days of age. The gestation period averaged 20 days with pregnancy recurring almost immediately after parturition. Litter sizes averaged 4.36 with 1 female producing 127 young in 33 litters.—*Item 425, p. 94.*

Sex Reversal in a Chicken.—A Black Orpington pullet developed an odd color

when 12 months old, then developed male plumage and, when 15 months old, began to behave as a male.

When mated, his fertility was low and many embryos died; the chicks produced were all males. Necropsy revealed this bird had a pair of normal testes and no ovarian or female tissues. The right kidney was absent.—*Item 497, p. 107.*

Fecal Transmission of Trichinella

Since *Trichinella spiralis* were found in eight species of wildlife in Iowa, the possible infection of grain-fed swine from such sources has been investigated. Although swine seldom eat the carcasses of such animals, except rodents, their feed could be contaminated with the infected feces of other species, such as foxes and rats.

In one series of experiments, the recipient swine were killed 28 days after exposure to feed contaminated by feces of the donor animals (foxes, rats), and measured sections of the pig diaphragms were examined for infection. When fox feces were fed; 12 of 13 pigs were heavily infected when the foxes had eaten infective *T. spiralis* material four hours earlier, 3 of 9 pigs were mildly infected when the interval since the foxes ate the material was 24 hours, only 1 of 5 pigs was infected when the interval was four days, and no pigs were infected when the interval was six days.

When the feces of rats were fed, recipient pigs were infected only when the interval between feeding the infective material to the rats and the recovery of their feces was four hours.

About 95 per cent of the larvae passing through the intestinal tracts of the donors could be recovered from the feces eliminated within 24 hours after ingestion. Partially immune animals eliminated a larger percentage of the trichinae than did nonimmune animals.—*W. J. Zimmerman et al. in J. Parasitol. (Aug., 1959): 441.*

Trichinosis in Foxes

An investigation on trichinosis in wild and domestic animals, except pigs, in Italy, revealed that 195 (32.8%) of 594 foxes were affected. Of 691 other animals, none were affected.—*L. Leinati and V. Marazza in Proc. Ital. Soc. Vet. Sci. (1958): 351.*

The Relationship Between Academic Attainment in Pre-Veterinary Medicine and Success in Veterinary Medicine

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AS ONE ASPECT in reviewing the method of selecting students for the College of Veterinary Medicine at Michigan State University, an analysis was made of the relationship between grades made by students in selected courses during their pre-veterinary medicine (VM) program and several indexes of the students' ultimate success in the College of Veterinary Medicine. Grades in these pre-VM courses were considered a possible basis for future programs of selection if attainment in these courses was highly related to success in the College of Veterinary Medicine.

All students who graduated from the College of VM at Michigan State University in 1957 and 1958 were used as subjects. After students with incomplete records were excluded, the final sample consisted of 111 students. Of these, 65 had taken all of their pre-VM work at MSU, while 46 had transferred to MSU from another institution. Independent analyses were made for each of these two groups because of the question of equivalence of grades from different institutions.

As the measure of relationship, product moment correlation coefficients were computed among 11 pre-VM grade point averages (GPA) and five criteria of success in VM. These correlations were to be studied for magnitude of relationship as well as for consistency of prediction for each of the two groups. Because each of these groups represents an independent analysis, the procedure provides, in part, a replication of findings or a cross-validation.

THE PRE-VM COURSES STUDIED

Because the Basic College at MSU requires all students to take a year of work in each of four courses, GPA's in Communi-

cation Skills, Natural Science, Social Science, and Humanities were used as four pre-VM attainment variables. The average grade in all four of these courses was also computed and called "total basic GPA."

Separate grade point averages were also secured in physics, chemistry, and mathematics. From these, a composite GPA in all three courses was computed as well as a GPA for physics and chemistry together. A final variable used was the total pre-VM GPA which was the grade average for all pre-VM courses taken by each student.

THE VM SUCCESS CRITERIA AND THEIR ANALYSIS

While the over-all GPA in VM provides a convenient criterion for judging scholastic success, the GPA's in the first two years and the last two years of VM were considered independently. The feeling was that the final two years of work, being more clinical in nature, could be more revealing than the GPA in the first two years. Faculty nominations were also secured by asking each member of the VM staff to nominate five students from both the 1957 and the 1958 graduating classes whom he regarded as showing the most promise and five students he regarded as showing the least promise in VM. The number of times a student was nominated was adopted as his "faculty nomination score."

Finally, student nominations were used as a fifth criterion variable. At MSU, seniors in VM are asked annually to nominate ten students for the Sol-Raskin award which is made to a graduating senior. The basis for this nomination is the question: "Who would I like to associate with in VM practice?" These student nominations were available for only the graduating class of 1958 and not for the graduating class of 1957.

The correlation between the first two-year VM GPA and the final two-year GPA was of the magnitude of grade-to-grade relationships usually found among college courses. Apparently the "more clinical"

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orientation of the final two-year professional VM program did not require a completely different pattern of skills from that necessary for success in the initial two years.

The faculty and student nominations, however, did not provide such a clear-cut pattern. There was a substantial positive correlation between the two sets of nominations, but the relationships between each of these two measures and the three indexes of academic attainment in VM were generally small and nonsignificant.

THE PREDICTIVE VALUE OF PRE-VM GPA'S

As expected from the analysis of the criteria where even grades in VM failed to relate highly with the two nomination variables, the magnitude of the correlations between the pre-VM GPA's and the student and the faculty nominations were uniformly low. All indexes of academic attainment seemed to assess characteristics which were essentially different from characteristics underlying the ratings.

Analysis of the relationship between the pre-VM GPA's and grades in VM showed the total pre-VM GPA, the individual physics or chemistry GPA's, and the physics-chemistry composite to provide markedly higher relationships to the criteria of success in VM than any of the other course patterns studied. Moreover, the chemistry GPA and the chemistry-physics composite were consistently superior as predictors of the VM GPA's for both the regular and transfer groups.

AN ILLUSTRATIVE PROGRAM OF SELECTION

It is now of interest to move from the analysis of relationships via group statistics to the applicability of these statistics in student selection. Since the total pre-VM GPA and the physics-chemistry GPA were most closely related to the criteria of success in VM, only these two measures of pre-VM attainment were considered in the illustrative program.

Twenty students were first selected from the 65 regular MSU pre-VM group who had the lowest total pre-VM GPA (2.65 and

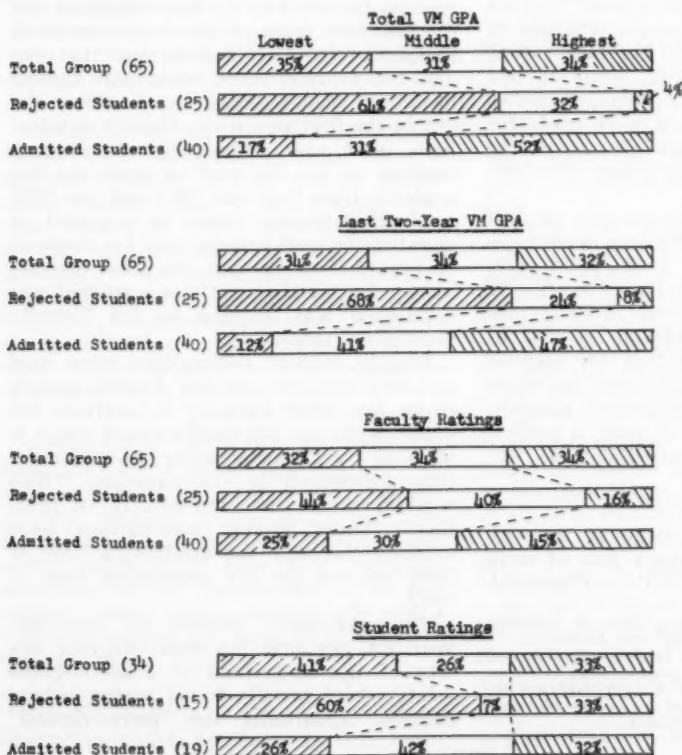


Fig. 1—Percentage of "rejected" and "admitted" candidates included in each of three intervals of the four veterinary medicine criteria. Critical points on the total veterinary medicine grade point average were 2.55 and 2.96; points on the two-year average were 2.75 and 3.11; faculty ratings of 20 defined the middle group; and Sol-Raskin points were 4 and below and 12 and above.

below) and 20 students were also selected with the lowest physics-chemistry GPA'S (2.30 and below). On this basis, 25 students failed to satisfy one or the other of these two arbitrary GPA levels and were regarded as students who could have been "rejected" in the years 1953 and 1954.*

The criterion status of these students after they had graduated in 1957 and 1958 is portrayed graphically (fig. 1). The first bar on the graph relative to each of the four criteria gives the percentage of all regular MSU students who fell within three criterion intervals. The second bar gives the percentage of the 25 "rejected" students who fell within the intervals defined by the same critical points. The third bar gives the same information for the 40 remaining students who were judged as "satisfactory candidates" by the two pre-VM GPA selectors and would therefore have been "admitted."

The data clearly portray a marked shift in the composition of the VM student body. For example, 64 per cent of the group of 25 "rejected students" received total VM GPA'S which ranked them among the lowest one third relative to all students graduating in VM, while only 4 per cent (1 student of the 25) attained a total VM GPA which was sufficient to be classified among the upper one third of the two graduating classes. In contrast, only 17 per cent of the "satisfactory candidates" performed at a level which classified them as ranking among the lowest one third of the VM classes which graduated in 1957 and 1958, while one half of this group attained a total VM GPA which ranked them among the highest one third.

Essentially, the same pattern is apparent when the last two-year "clinical sequence" is used as the criterion. The more "global" reactions of the faculty and students do not mark the "rejected students" as radically different from the remainder of the class, but even here, a relatively higher proportion of this group of 25 was viewed as "less desirable."

As a whole, the data support the applicability of pre-VM GPA'S in a program of selection. Had the 25 candidates been rejected, and had 25 other candidates who were in other respects like the remaining

40 students been selected in their place, the relative performance of this new class would have been substantially superior to the performance of the classes which graduated in 1957 and 1958.

The transfer students were not included in the graphic tabulations because total pre-VM GPA'S were not generally available for this group. However, application of the same physics-chemistry pre-VM GPA cut-off of 2.30 would have screened out 13 of the 45 transfer students. Of these 13 students, eight had a total VM GPA of 2.55 and lower which ranked them among the lowest one third in academic attainment among the entire graduating classes of 1957 and 1958. In other words, where less than one third of the students would have been rejected, more than one half of these rejected students were among the lowest one third of all students on this one criterion of success in VM.

DISCUSSION

From the foregoing analysis, it is apparent that the over-all quality of students admitted into the professional schools in Veterinary Medicine can be improved by use of data available in the student's transcript of credits. It is also of interest to observe the applicability of transcripts for transfer students. While it is known that grading systems vary among various colleges, the data here would suggest that the diverse grading standards are less marked in science courses.

It is also of interest that the science course grade average and the total pre-professional GPA proved to be superior to other grades as indexes of later success in the professional school. While not unexpected, the findings do verify what is probably a prevalent opinion. The sizable relationships revealed in this study are consistent with findings in an earlier study in which significant correlations were found between first-year grades in VM and grades in pre-professional chemistry and zoology.¹

While the illustrative program presented used only the two pre-professional GPA'S as the basis for selection, other factors such as scores on appropriate aptitude tests or a weighing of relevant experiences in the student's background would undoubtedly be

*Of these 25 students, 15 students fell below the critical points on both measures. The status of these students on the criteria was similar to that of the entire group of 25, however, and is therefore not reported here.

¹Payne, L. C.: The Development of an Aptitude Test for Veterinary Medicine. J.A.V.M.A., 117, (Aug., 1950): 96-99.

desirable in actual selection. It would, however, be desirable to verify the applicability of these supplementary bases for selection, since a multitude of factors to be considered can well confound the problem of selection rather than enhance the over-all program.

SUMMARY

The relative attainments of 111 students who had graduated from the College of Veterinary Medicine in the years 1957 and 1958 were compared to several indexes of college attainment prior to the students enrolling in veterinary medicine (VM). The correlational analysis isolated the total pre-VM grade point average (GPA) and the GPA in physics and chemistry as most indicative of academic attainment in VM. While an attempt was made to broaden the basis for defining "success in VM" by including student and faculty nominations, these supplementary criteria seemed to assess characteristics which were largely independent of all indexes of academic attainment.

On the basis of the two pre-VM GPA'S, an illustrative program of selection was presented to candidly portray the application of the findings from the correlational analysis to the problem of selection.

Observations on Listeriosis

Listeriosis is gaining in importance as an anthroprozoosis in almost all countries. Some believe *Listeria monocytogenes* to be ubiquitous. In Germany it occurs mostly in sheep; in Holland mostly in cattle. Goats, swine, and fowl are also often infected, and horses, dogs, and cats occasionally. Rodents (rats, mice, and rabbits) seem to have a special predisposition for the disease and are an important source of infection.

There are four forms of listeriosis: septicemic, encephalitic, metritic, and mastitic. The septicemic form occurs mostly in infants and young animals which lack resistance. Foals, calves, and lambs may develop enteritis, pericarditis, or only generalized infection. Suckling pigs develop trembling, spastic paresis, and convulsions. At necropsy, most young animals show miliary necrosis in many organs, especially the liver.

Rodents and fowl of all ages develop the septicemic form. The listeria infection may be secondary to other infections such as

fowl cholera, pullorum disease, leukosis, and parasites.

The encephalitic form most often affects adults (man and animals). It must be differentiated from Borna disease, rabies, poisonings and, in cows, from parturient paresis. In such cases no lesions may be found at necropsy.

Metritis with sterility often develops in man and ruminants. Abortions have also been reported in horses and rabbits. In seven years, more than 200 cases of human abortions, stillbirths, and infant fatalities due to listeriosis were reported in Germany. Pregnant animals have a predisposition for oral infection which is often followed by transplacental infection. Nonpregnant animals have much greater resistance. *Listeria* have been isolated from artificially inseminated animals, the organism having survived both antibiotics and freezing. Veterinarians should guard against infection when handling obstetrical cases.

Listeria can cause atypical mastitis and be eliminated with the milk. Milk from a cow with mastitis was injected intravenously into a lactating sheep, and *Listeria* could be isolated from the ewe's udder for 2.5 years. However, mastitis due to *Listeria* is relatively rare.—J. D. Jentzsch in *Monatsh. f. Vet.-med.* (July 15, 1959): 443.

Congenital Toxoplasmosis in Mice

Congenital transmission of viruses, rickettsiae, spirochetes, and piroplasms is fairly common in arthropods and may occur through many generations. In mammals it is less common and it usually stops with the second generation. However, the virus of lymphocytic choriomeningitis can be transmitted indefinitely in mice.

Toxoplasma was reported to be congenitally transmitted to the third generation of rats and to the fifth generation of mice. The organism has been isolated, by inoculation, from both the fetuses and the milk of mice. Natural infection, except by cannibalism, is almost unknown in mice; however, they are susceptible to inoculation with proliferative forms, and to feeding with cysts.

The disease need not be recent or acute for congenital transmission. One congenitally infected mouse produced congenitally infected offspring in each of her four litters.—*Nature* (May 9, 1959): 1348.

Bovine Abortion Due to Haemophilus Species

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CULTURES FROM an aborted bovine fetus, the third abortion in a dairy herd of 50 cows in slightly more than a month, yielded an organism which was identified as a member of the *Haemophilus* genus. Inasmuch as members of this genus are not generally considered to be a cause of abortion, the organism was subjected to additional study. The results of this study, as well as cultural and serologic findings on the cows, are reported here.

MATERIALS AND METHODS

X-Factor.—An aqueous solution containing 0.03 mg. per milliliter of hemin was sterilized in an autoclave. This stock solution was added to the basal medium after sterilization to give a final concentration of 0.015 mg. per milliliter of medium.

V-Factor.—Baker's yeast was extracted following the method of Miles and Gray² and filter-sterilized.

Basal Medium.—The basal medium for growth factor trials consisted of 100 ml. of water, 2 Gm. of proteose peptone, and 0.6 Gm. of sodium chloride. The medium was placed in tubes, 5 ml. per tube, and autoclaved. For use with either X-factor or V-factor, the medium was made double strength and diluted after sterilization with an equal volume of the desired growth factor.

Nitrate Reduction.—The basal medium with 0.2 Gm. of potassium nitrate added to each 100 ml. was used. After sterilization, 1 per cent of sterile defibrinated bovine blood was added and the tube heated at boiling for two minutes. Inoculated tubes were tested for the presence of nitrite at intervals of one to four days following inoculation, using sulfonilic acid and *alpha* naphthylamine reagents.

Carbohydrate Fermentation.—The previously described basal medium with Andrade's indicator was used. After sterilization, 20.0 per cent of V-factor and 0.5 per cent of filter-sterilized carbohydrate were added to each tube. The cultures were incubated for 20 days before the final observation was made. Controls consisted of such tubes, inoculated and uninoculated, also with and without added carbohydrate.

Antigen.—Albimi Brucella broth* containing 20 per cent of V-factor was inoculated with 48-

hour broth growth. The atmosphere in the flask was reduced to 10 inches of mercury by suction, and the flask was then placed on a shaker at 37 C. A heavy growth was present after 24 hours' incubation. The culture was killed with 0.3 per cent formalin and washed twice in formosaline solution. The density was adjusted photoelectrically to a value between McFarland tubes 1 and 2. The tube-agglutination test was set up with serial dilutions using essential controls. Readings were made after 24 hours' incubation at 37 C.

FETAL ISOLATE

The fetus was brought to the laboratory on Nov. 26, 1957. There was marked sanguineous subcutaneous edema along the ventral surface and bloody fluid was found in the thoracic cavity. The liver was light yellow. Smears from the stomach revealed large numbers of gram-negative rods which ranged from short to very long forms.

Cultures from the heart, stomach, and pleural fluid on Albimi Brucella agar slants and in semisolids revealed a light growth of gram-negative rods after 48 hours' incubation in an atmosphere of 10 per cent carbon dioxide. The morphologic characteristics were similar to those observed in the direct smears from the fetus. Subcultures to the same medium failed to grow, but a light growth of pinpoint, dirty-gray colonies was obtained after 72 hours' incubation on blood agar base (Difco) containing 5 per cent defibrinated bovine blood. The colonies were surrounded by a 3-mm. zone of *beta* hemolysis. Subcultures to chocolate agar slants and plates yielded a good growth after 48 hours' incubation in air.

Growth trials in the basal medium showed that the isolate required V-factor (coenzyme I) but did not require X-factor for growth. Trials with V-factor extracted from yeast and with commercially prepared cozymase (dihydrodiphosphopyridine nucleotide) confirmed the requirement for this factor. Satellite colonies were obtained near colonies of *Staphylococcus albus* on the basal medium, which failed to support the isolate by itself.

The organism was nonmotile and non-capsulated. On agar slants with added V-

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*Albimi Laboratories, Brooklyn, N.Y.

factor, the growth developed a lemon color after several days' incubation. Sucrose, sorbitol, xylose, mannose, mannitol, glucose, and levulose were weakly fermented with the production of small amounts of acid. Trehalose, salicin, dulcitol, galactose, maltose, dextrin, inositol, and lactose were not fermented. Urease, indole, and hydrogen sulfide were not produced. Gelatin was not liquefied and no change was observed in litmus milk to which V-factor was added. Nitrate was reduced to nitrite. Growth in semisolid stabs took place just below the surface of the medium. A fine turbidity appeared in broth tubes and the small amount of sediment present was readily suspended by agitation.

VAGINAL ISOLATE

On Dec. 23, 1957, vaginal mucus for culturing and blood for serologic testing was collected from the 3 cows. Cultures from the 2 cows which had aborted 69 and 48 days previously were negative for *Haemophilus*, but the organism was isolated from the last cow to abort. The morphologic and physiologic characteristics of this organism were identical to those of the organism isolated from this cow's fetus, aborted approximately a month earlier.

SEROLOGIC FINDINGS

Antigen prepared from the fetal isolate was not agglutinated by serums from any of the 3 cows, but antigen prepared from the vaginal isolate gave the following titers: cow 1, 1:100; cow 2, 1:50; cow 3, 1:3,200. It is conceivable that the fetal isolate lost its antigenic capability or that there may have been a variation in the antigenic pattern of the organism between isolation and production of the antigen. Negative control serums failed to agglutinate either antigen.

DISCUSSION

Inasmuch as examination of the literature failed to reveal any record of abortion in cattle due to infection with a member of the genus *Haemophilus*, the isolation of a member of this genus from the aborted fetus, as well as from the vaginal mucus of the cow nearly a month after abortion, was considered of interest. It is possible that cows 1 and 2 also aborted due to infection

with the same organism since they showed low serum titers against antigen prepared from the vaginal isolate. Unfortunately, the antigen prepared from the fetal isolate was not agglutinated by any of the serums tested.

The herd did not have any conception difficulties and none of the cows showed signs of illness either before or after abortion. All abortions took place in the seventh month of pregnancy. Cows 1 and 2 were purchased some years earlier as mature animals and cow 3 was raised in the herd.

The identification of members of the *Haemophilus* genus as to species is not always readily accomplished. The yellow color developed by the isolate and the production of hemolysin could indicate a relationship to *Haemophilus citreus*, which has been isolated from the genital secretions of cows.¹ However, *H. citreus* produces indole while the isolate under study did not.

SUMMARY

A member of the *Haemophilus* genus was isolated from a bovine fetus aborted by a dairy cow in the seventh month of pregnancy. An organism identical in morphologic and physiologic characteristics to the fetal isolate was recovered by flushing the vagina approximately one month after abortion.

The organism required V-factor (coenzyme I) for growth but did not require X-factor (hemin). It resembled *Haemophilus citreus* in some respects, but did not produce indole.

References

¹Breed, R. S., Murray, E. G. D., and Hitchens, A. P.: *Bergey's Manual of Determinative Bacteriology*. 7th ed. Williams and Wilkins Co., Baltimore, 1957.

²Miles, A. A., and Gray, J.: *Haemophilus parainfluenzae* Endocarditis. *J. Path. and Bact.*, 47, (1938): 257-277.

Insemination Time and Fertility in Turkeys

Egg fertility was 12 to 18 per cent less when turkey hens were inseminated while hard-shelled eggs were in the uterus (9:00 a.m.) than after the eggs had been laid (1:00 p.m.). The over-all average fertility from artificial insemination was 82.5 per cent.—*Poult. Sci.* (July, 1959): 828.

Detachment of the Retina in Animals

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THE FIRST comprehensive discussion of retinal detachment in animals appeared in 1906.¹ Nineteen reports of detachment in horses, swine, rabbits, dogs, and fowl were included. This was followed, in 1914, by a slightly expanded section in a text² which included several new cases in cats with tuberculous choroiditis. Six years later, a number of new cases of retinal detachment were reported, including several which were personally observed.³ The author described the condition in detail, with a number of photographs and drawings to illustrate the clinical appearance and pathologic characteristics. In a later publication,⁴ he described the pathologic features alone, drawing heavily on his earlier writings. None of these books are in print and only one⁵ has been translated into English.

Two papers describing retinal detachment are recorded in recent French journals. In one,⁷ the author reviewed the literature and described 2 cases of retinal detachment in the dog which reattached spontaneously. The other publication² was not obtainable. A short section in a recent book¹⁰ is superficial and adds nothing to previously published material.

This report will describe the causes, pathogenesis, clinical signs, and pathologic characteristics of retinal detachment. Five cases which illustrate various features are cited: retinal detachment in an English Pointer following a perforating wound of the globe; in a cat with acute pyelonephritis; in an English Setter resulting from intraocular metastatic tumor; and 2 Collies in which retinal detachment occurred as a result of hereditary disease.

Detachment of the retina is found occasionally in dogs, cats, horses, swine, cattle, and other mammals and birds.^{1,6,8} It has rarely been reported in cattle. It is therefore interesting that it was first seen in a cow in 1691.⁷

By definition, retinal detachment consists of separation of the retina from its underlying pigment epithelium (fig. 1). The space thus formed corresponds to the embryonic separation between the outer and inner layers of the optic cup. According to one writer,⁴ "Retinal detachment does not refer to a disease, but is only an anatomic concept." The retina is attached to the pigment epithelium only at the optic papilla and at the ora serrata. Between these two areas the retina and pigment epithelium are in contact only as two moist layers, held in position by the pressure of the vitreous. In retinal detachment, the space between the two layers, which is the vestige of the central cavity of the optic vesicle, may be filled with material which varies in different types of detachment.

ETIOLOGY AND PATHOGENESIS

The causes of retinal detachment may be divided into three principal groups.

Forces Which Push the Retina Away from the Underlying Pigment Epithelium.—In chorioretinitis, subretinal exudates may be produced as a response by the tissues to infective agents or their by-products. The exudates may be localized or extensive, and the nature of the subretinal fluid varies. In focal retinitis, isolated pools of fluid accumulate between the retina and pigment epithelium, causing detachment over circumscribed areas. When exudation is extensive, there may be detachment of correspondingly larger segments of retina. The subretinal fluid is a high protein exudate containing acute or chronic inflammatory cells or both.

Early in recurrent equine periodic ophthalmia, exudation takes place from the congested choroid or retina. Fluid which collects subretinally may cause retinal detachment of greater or lesser degree.

This group also includes detachment brought about by parasites such as filaria, trematodes, platodes, and cysticerci.^{1,6,10} Such parasites may produce detachment by mechanical means, but mainly from the exudative reaction on neighboring tissues.

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Thanks are due Evelyn Grant for drawings depicting the appearance of the fundi and for preparation of illustrations.

Albuminuric retinitis may cause detachment of the retina in man, but has not been reported in lower mammals. In examining the eyes of 100 dogs with nephritis, one writer⁵ was unable to find characteristic signs of albuminuric retinitis. Detachment of the retina has been reported in canine diabetes and in ocular tuberculosis of other animals.

Spontaneous reattachment is possible after detachment from exudative choroiditis or hemorrhage. When the intervening fluid is reabsorbed, the detached retina may fall back on the pigment epithelium and permanent adhesions have been known to take place. Recovery of vision depends on the duration of the detachment and other factors affecting the integrity of the retinal nervous elements.

Because of its rich blood supply, the choroid, as well as other parts of the uvea, are frequently sites for metastatic neoplasms. Detachment of the overlying retina is brought about by intrusion of neoplastic tissue between the two layers. The detachment may be more extensive than the tumor itself, the intervening space being filled with a transudate or hemorrhage. In retinal detachment from a tumor

of the choroid, the pigment epithelium may be elevated. This was seen in case 3.

Forces Which Pull the Retina Forward.—In intraocular infection, inflammatory exudates arise in the anterior, posterior, or vitreous chambers. Undergoing contraction in the cicatricial stage, fibrovascular membranes develop which exert traction anteriorly on the ciliary body or retina, resulting in detachment. This mode of retinal detachment is a frequent late sequel when equine periodic ophthalmia is characterized by violent endophthalmitis.⁶

Retinal detachment may also occur following vitreous loss from perforating injuries of the globe or following surgery. With loss of the supporting volume of vitreous, and formation of retinal tears, the retina falls forward and a cell-free transudate or hemorrhage fills the sub-retinal space. This mode of detachment may be observed when the normal enucleated eye is opened at the equator. Such eyes show total retinal detachment as the vitreous flows from its cavity, depriving the retina of support. The retina assumes a typical, funnel-like form and this is referred to as an artificial retinal detach-

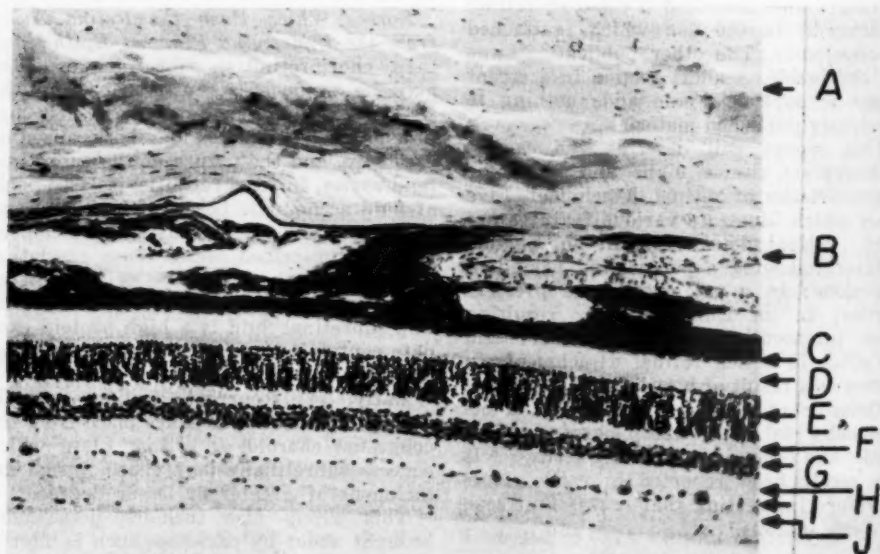


Fig. 1—Normal retina, choroid, and sclera of a dog. Histological section: (A) sclera; (B) choroid; (C) pigment epithelium; (D) layer of rods and cones; (E) outer nuclear layer; (F) outer plexiform layer; (G) inner nuclear layer; (H) inner plexiform layer; (I) ganglion cell layer; (J) nerve fiber layer. H & E stain; $\times 105$.

ment. Subretinal fluid is absent, while it is always present in true detachment.

Detachment is seen after lens luxation, especially when the lens is deviated posteriorly toward the ciliary body, or into the vitreous cavity. A severe cyclitis or vitreitis ensues with formation of membranes which pull the retina anteriorly.

Retinal Tears and Cysts.—The most common cause of retinal detachment in man, idiopathic or serous detachment, is caused by tears in the retina or rupture of retinal cysts with escape of fluid or vitreous subretinally. The literature does not disclose a case of retinal detachment in lower mammals with this cause. However, retinal cysts have been reported in the horse and the dog^{6,8} and have been seen in my clinic. They are found in detached retinas and in otherwise apparently normal retinas. In old animals, especially those with retinal atrophy, small cysts are commonly seen close to the ora serrata, and less often, encroaching on the central parts of the retina. They are known as Blessig-Iwanoff's cysts or edema. Seen ophthalmoscopically, they are approximately 1/20 papilla diameter in size, round or oval, and are lighter in color than the surrounding retina.

Larger cysts have also been observed. A 12-year-old English Sheep dog examined by me had numerous clear-walled cysts, measuring 2 to 3 papilla diameters, which were distributed around the optic disk. The elevation of the cysts could not be estimated because of the perfect transparency of the wall, but the diameter was measurable at the base. In the floor of the cysts, there was a peripheral aggregation of dark blue streaks and dots while the central part was pale yellow with a distinct tapetal reflex.

Micro- and macro-cystoid degeneration is a well established lesion in the horse and dog, and while a direct cause and effect relationship cannot be proved, it is probable that detachment may result from rupture of retinal cysts. Relatively mild injury or a sudden movement of the head or the eyes have been known to result in retinal detachment in degenerated eyes.

CLINICAL SIGNS

Animals with detachment are usually examined late because signs are not apparent until vision is markedly reduced.

When one eye is affected, signs may be absent since the conduct of the one-eyed animal is not appreciably altered. Only in dogs regularly used for hunting, or horses used for jumping, is the loss of vision likely to be noticed by the owner. Small detachments do not markedly impair vision, and detachments of considerable size may be consistent with retention of useful vision. As detachment progresses, vision is correspondingly reduced and the eye is blind in total detachment.

Detachment may be unilateral and insidious, as in choroidal neoplasms, or bilateral and sudden, as in exudative choroiditis. Simultaneous detachment in both eyes is reported in this paper and has been mentioned by others.^{6,7}

Affected animals have signs usually associated with loss of vision from any cause. Dogs may have difficulty in finding the food pan, they may bump into obstructions, or prefer to follow, rather than lead, other dogs. Blind animals have a staring expression because of retraction of the eyelids. In pups, signs are difficult to detect. In animals with nervous temperament, signs of reduced vision are accentuated. Cats have remarkable ability to adapt to blindness and they avoid obstructions more easily than dogs similarly affected. Their movements are calculated and careful and the head is lowered and extended.

Changes in the media may make it difficult or impossible to diagnose detachment. Occurring coincidentally, or in a cause and effect relationship, opacities in the lens, and exudates or hemorrhage in the vitreous, prevent a clear view of the fundus. In the vitreous of some animals, tiny, refractile bodies known as synchysis scintillans may interfere with a clear view of the fundus. They are more or less free-floating and move inversely to the movements of the eye.

In retinal detachment, the eye is usually soft and the pupillary light reflex may be delayed and incomplete. In the eye blind from detachment, the pupil constricts with miotics, but remains unchanged to light. The pupillary reflex is muddy, greenish, or gray, and is sometimes described as "amaurotic cat's eye."

Examination is made in a dark room with focal light and an ophthalmoscope. The anterior eye segment is first examined with a bright source of light such as the

hand slit lamp of Barkan.* It is often possible to see extensive detachments with focal light alone, especially if they are central or above the disk, and the elevated retina is sufficiently hyperopic. It is generally agreed that dogs and cats and most of the lower mammals do not possess a true macula,³ but instead have a less sensitive macular area. Using this area as a point of reference, the observer usually finds the disk and central retinal vessels to be in focus with a minus 6, 7, or 8 lens in position in the ophthalmoscope. In detachment, the retina is anterior to its normal position and more plus lenses are needed to bring it into focus. It is not unusual to find the summits of detached retinas in focus with plus 6 or even more convex lenses. By measuring the height of the retina at various points, it is possible to gain some idea of the topography of the detached layer.

OPHTHALMOSCOPIC APPEARANCE

This is characterized by great variety from case to case. Generally, the detached retina is gray and silvery, and dependable landmarks may be difficult to find. The retina may waver or undulate with movement of the eye or release of scleral pressure. The vessels are usually attenuated; they may disappear beneath a fold of detached retina and reappear at some distance.

When the immediate peripapillary area is involved, the edges of the disk are indistinct and the pigment characteristic of this region may be absent. The color of the disk may be green, orange, red, or white. Often only one vessel can be seen emerging from the disk to be quickly lost in the folds of detached retina.

TYPES OF DETACHMENT

The principal types of detachment may be classified according to their topography or extent. They may, therefore, be partial or total, flat, undulating, radiate, bullous, or blister-like, and infundibuliform. Older terminology also includes mammillated or nipple-shaped detachment. Topographical classification refers only to the form of the detached part and its description may challenge the observer's vocabulary. A radiate detachment may also be flat, and

infundibuliform detachment is usually total. Detachment at the ora serrata is known as a disinsertion.

In flat detachment, the retina is thrown into straight or undulating folds extending somewhat radially from the disk. The detached parts of retina are more or less hyperopic and it may be difficult to visualize more than one or two papilla diameters of the surface at a time because of the variation in elevation between adjacent parts. Constant changes of lenses in the ophthalmoscope are needed to keep the retina in focus.

Bullous detachments have also been described in the lower mammals.⁸ They may be multiple or single, small or large, and lie in any quadrant. The specific gravity of the subretinal fluid tends to increase in time, causing the fluid to gravitate to the inferior part of the globe. In bullous detachments, retinal vessels may be seen to disappear as they reach the base of the bulla and reappear on the detached part with some displacement.

In disinsertion, the retina in the detached part can be seen to curl away from the site of previous attachment and the underside of the retina may come into view. The uncovered pigment epithelium and choroid are visible as an orange-red background in which the choroidal vessels can be seen.

When retinal detachment progresses and the retina is adherent only at the optic disk and the ora serrata, it is known as total detachment.

CASE HISTORIES

CASE 1

The left eye of a female English Pointer, 8 years old, was examined Feb. 11, 1955. It had been taken hunting earlier that day. Examination of the eye was difficult because of severe blepharospasm. Under thiopental sodium (Pentothal Sodium**) anesthesia, the conjunctiva was found to be markedly chemotic. Just below the center of the cornea, a pouting, ragged wound, 1.5 by 1.5 mm. was seen, from which aqueous material flowed. The anterior chamber was shallow and the iris was in contact with the inferior part of the wound. The lens could not be seen because of hyphema. A radiograph revealed a shot-

*Otto Barkan Focal Illuminator, Parsons Optical Laboratories, San Francisco, Calif.

**Pentothal Sodium is produced by Abbott Labs., Chicago, Ill.

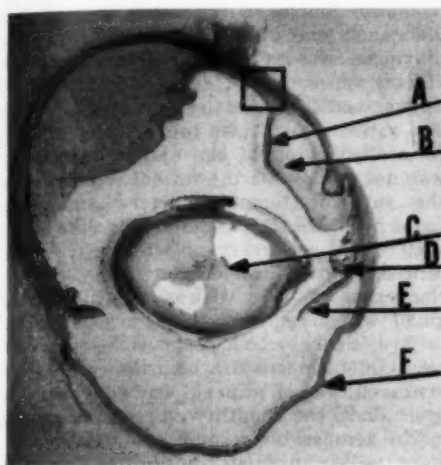


Fig. 2A—Retinal detachment in a cat (case 2). Horizontal section: (A) retina; (B) subretinal exudate; (C) lens; (D) ciliary body; (E) iris; (F) cornea. H & E stain; x 3.

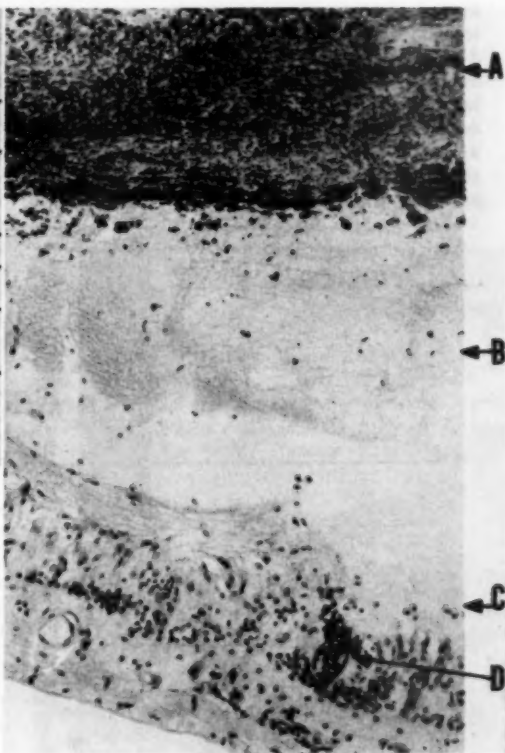


Fig. 2B—Section of boxed area shown in figure 2A. Histological section: (A) choroid with heavy infiltration of inflammatory cells; (B) subretinal exudate; (C) detached and degenerated retina; (D) inflammatory cells in detached retina. H & E stain; x 105.

gun pellet in the left temporal fossa which was thought to have produced the corneal wound.

Treatment consisted of steroids and antibiotics systemically, and 1 per cent atropine and 10 per cent neosynephrine topically. Acute symptoms persisted for one week with gradual decrease of blepharospasm and photophobia. At the end of that time, the anterior chamber had re-formed. A dense white scar could be seen at the site of injury and an anterior synechia was present. The hyphema had disappeared; however, blood in the vitreous prevented examination of the fundus. The visible lens was clear and the inferior part of the lens behind the iris adhesion could not be seen.

Re-examination on May 12, 1955, revealed diminished signs. The pupillary reaction to light was prompt and complete, except at 6 o'clock, where there was an anterior synechia. The scar in the cornea was flat and gray. There was a bullous detachment in the inferior quadrant of the

fundus, involving approximately one sixth of the retina. Testing vision in this eye by occlusion of the fellow eye indicated that useful vision was present. An automobile accident the same day resulted in death of the animal and the eye was removed for study.

Histologic section revealed a detachment in the inferior segment. The subretinal fluid contained occasional red blood cells and many polymorphonuclear leukocytes and lymphocytes. The inner retinal layers were thickened and contained cysts. There was a choroidal scar 3 mm. in diameter which was assumed to be the point where the shot left the eye. The diagnosis was perforating injury of the globe, retinal detachment, and mild iridocyclitis.

CASE 2

A castrated male cat, 13 years old, was first examined Aug. 11, 1958, because of failing vision. The ocular media of the right eye were clear. There was no pupil-

lary light response and the pupil was widely dilated. Digital palpation revealed a soft eye. Extensive bullous detachments of the retina were visible under focal illumination as blister-like, gray elevations covering most of the fundus and separated by deep clefts (fig. 5). The attenuated retinal vessels could be followed over large parts of the detached retina. There were

two large bullae in the upper half of the globe and one bulla below the disk. The diagnosis was retinal detachment of the bullous type.

The media of the left eye were clear. The retina was thrown into folds radiating from the region of the optic disk, which was not visible. Of the retinal vessels, only the superior temporal artery and vein could be seen extending 5 papilla diameters toward the ora serrata where it disappeared beneath a fold of retina. Most of the retina was gray with many white folds, all of which required stronger plus lenses to see clearly. The diagnosis was total retinal detachment in which the retina was arranged like a funnel, the apex at the optic disk, the mouth at the ora serrata.

The temperature, pulse, and respiration were within normal limits. A urinalysis disclosed a pale, amber urine with a specific gravity of 1.035, albumin, 2 plus; sugar, negative. Microscopic examination of the urinary sediment revealed many granular and cellular casts, 40 to 50 red blood cells per high-power field, and the field packed with polymorphonuclear leukocytes. The blood count revealed 5,380,000 red blood cells and 8,150 white blood cells per cubic millimeter. The Schilling hemogram revealed 64 per cent segmented neutrophils,

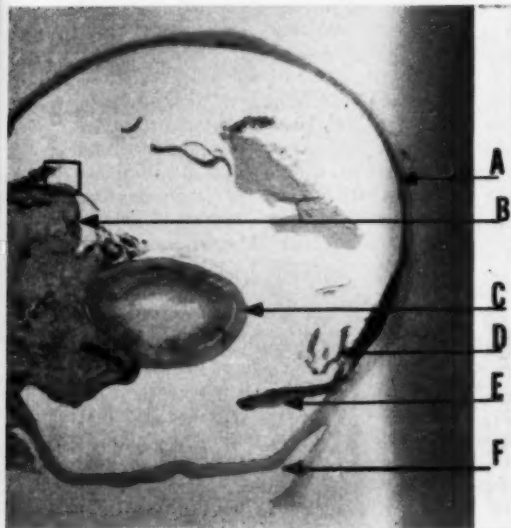


Fig. 3A—Retinal detachment in an English Pointer (case 3). Horizontal section: (A) undetached retina; (B) detached retina, tumor of ciliary body; (C) lens; (D) ciliary body; (E) iris; (F) cornea. H & E stain; x 3.



Fig. 3B—Section of boxed area shown in figure 3A. Histological section: (A) reflected retinal fold; (B) retina; (C) hemorrhage; (D) tumor. H & E stain; x 52.

33 per cent lymphocytes, and 3 per cent eosinophils. The diagnosis was pyelonephritis. After one week of treatment with antibiotics, the eyes remained unchanged except for the appearance of flame-shaped retinal hemorrhages which appeared in the right eye and followed the vessels. Because of blindness and advanced age, the cat was euthanatized.

Histologic section of the right eye revealed lymphocytic infiltration of the iris and trabecular meshwork. The choroid was heavily infiltrated with inflammatory cells, predominately lymphocytes and polymorphonuclear leukocytes, which distorted the choroidal architecture. The retina was detached in several areas posteriorly and the subretinal space was filled with lightly staining material containing nuclei of white blood cells (fig. 2B). Overlying these areas, the rod and cone layer was distorted. The optic disk was heavily infiltrated with inflammatory cells and the infiltration extended into the optic nerve. There were similar findings in the left eye, but the inflammatory response was more pronounced. One area in the choroid near the optic disk had the appearance of an abscess. The diagnosis was endophthalmitis and exudative retinal detachment. The diagnosis of pyelonephritis was confirmed at necropsy.

CASE 3

Because of mammary tumors, a female English Setter, 8 years old, was subjected to ovariectomy and multiple mastectomy in September, 1956. It was examined again in February, 1957, because of a seemingly painful left eye. Examination revealed a cloudy cornea with marked episcleral injection. The anterior chamber was shallow and in the superior part was a pale pink, rounded mass, 6 mm. wide, which projected into the angle from the base of the iris. The eye was enucleated because of pain and blindness. Three weeks later, the right eye suddenly became painful. Examination revealed a hard, intensely inflamed eye with a cloudy cornea and shallow anterior chamber. There was a marked aqueous flare and only a fundus reflex could be seen with the ophthalmoscope. Euthanasia was carried out and both eyes were examined in detail.

Histologic sections of the right eye showed the iris and ciliary body to be

packed with neoplastic cells. Tumor emboli were also seen in the vessels of the ciliary body. The left eye had a similar tumor of the ciliary body and the adjoining choroid, which proved to be a fibrochondro-sarcoma. In some sections (fig. 3), the tumor had elevated the retina and the retinal pigment epithelium from the underlying choroid, causing retinal detachment. There was some hemorrhage between the detached parts. Diagnosis was metastatic tumor of both eyes with retinal detachment in one.

CASES 4 AND 5

Two male Collie dogs, 6 months old, were examined because of failing vision. Both dogs had bilateral retinal detachment of greater or lesser degree. The sire of one of the dogs had an anomalous disk ectasia. The dam of the other dog had an intraocular hemorrhage in the left eye, and the right eye had a deep wedge-shaped hole in the superior segment of the optic disk with a posterior staphyloma in the corresponding segment of the eye.

Both dogs had total retinal detachment of the flat type in which the retina re-



Fig. 4—Retinal detachment in a Collie dog (case 4). Histological section: (A) atrophic inner retinal layer; (B) cyst formation in outer retinal layers; (C) atrophic choroid; (D) sclera. H & E stain; x 84.

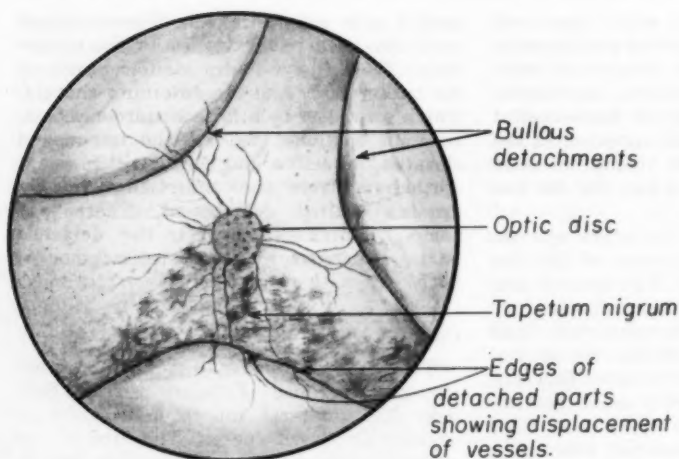


Fig. 5—Retinal detachment in a cat (case 2); ophthalmoscopic appearance.

mained attached only at the optic disk and at the ora serrata. One eye had a combined flat detachment above with a bullous detachment below (fig. 6). In addition, one dog had a disinsertion at the ora serrata in which the retina was torn away from its attachment over a large crescentic area. Underneath the detached retina the choroidal vessels could clearly be seen. Both dogs had many small, round or oval cysts of the retina which were $1/20$ papilla diameters wide and uniform in size.

Histologic sections of the eyes revealed thinning of the sclera and in one eye there was a posterior staphyloma near the optic disk. The choroid was atrophic and the vessels were absent in some sections. In most of the sections the retina was twisted

and misshapen in processing. It was atrophic, the anterior layers were gliosed, and there were many cysts in the outer layers (fig. 4). The rod and cone layers were atrophic and in most of the sections they could not be identified.

The mode of detachment of the retina in these 2 cases is not certain; however, it may have followed rupture of cysts with escape of fluid subretinally. Some congenital anomalies of the Collie eye have been reported elsewhere.⁹ It does not lie within the scope of this paper to discuss the underlying hereditary defect.

DISCUSSION AND CONCLUSION

In comparing the lower mammalian eye with the human eye there are more simi-

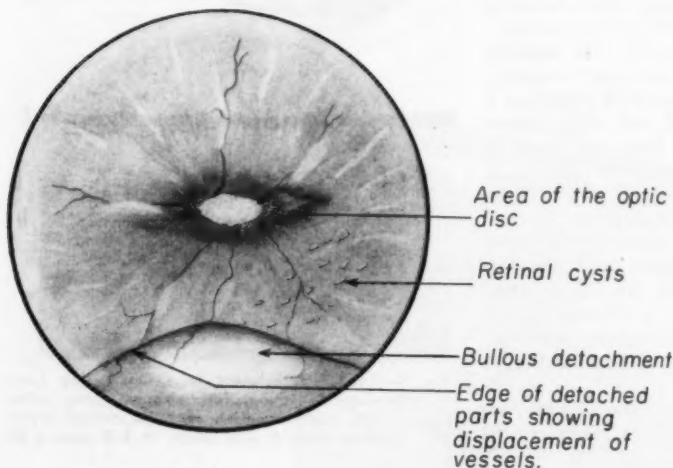


Fig. 6—Retinal detachment in a Collie dog (case 4); ophthalmoscopic appearance.

larities than differences. As might be expected from such studies, the pathogenesis and pathologic characteristics of retinal detachment in lower mammals do not differ greatly from that in man. From a review of the literature and study of a number of cases, the following observations may be made.

Retinal detachment occurs from exudates, transudates, hemorrhage, and neoplasms, forces which operate to push the retina away from the underlying choroid.

Retinal detachment may also occur from fibrovascular membranes which undergo contraction in the cicatricial stage, exerting forces which pull the retina away from the choroid.

Idiopathic, or serous retinal detachment, has not been reported in the lower mammals, yet it is the commonest type in man. Retinal cysts have been seen repeatedly in horses and dogs. They may rupture to allow the fluid to escape subretinally, producing detachment. Two cases in dogs are presented in which this was thought to be the mode of detachment.

The end results of retinal detachment are many and complicated. The retinal pigment epithelium tends to proliferate and colloid bodies known as drusen form on the lamina vitrea. The choroid atrophies and the vessels become attenuated. In the detached retina, the rods and cones undergo degenerative changes consisting of shrinking or vacuolation, and in time they may diminish or disappear. The neurons atrophy and are replaced by glial connective tissue. Cystoid degeneration is common. It may be a pre-existing lesion, but once separation has occurred, the cystoid spaces usually enlarge. With the passage of time, progressive atrophy, cystoid degeneration, and glial proliferation obliterate all vestiges of normal retinal architecture. Cataracts and iritis may occur late; intraocular hemorrhage, glaucoma, or phthisis bulbi may finally supervene.

References

- ¹Bayer, Joseph: Tierärztliche Augenheilkunde. 2nd ed. Wilhelm Braumüller, Vienna, 1906.
- ²Brion, A., and Collet, P.: Detachment of the Retina in the Cat. Bull. Soc. Sci. vet., Lyon., 39, (1936): 174-179.
- ³Bruckner, R.: Über den Ophthalmoskopischen Nachweis von Fovea und Area bei Tieren. Ophthalmologica, 118, (1949): 969-980.
- ⁴Fuchs, Adalbert: Diseases of the Fundus Oculi with Atlas. First English ed. Blakiston Co., Philadelphia, 1949.

⁵Jakob, Heinrich: Pathologische Anatomie des Auges der Tiere. Separat-Abdruck aus "Ergebnisse der Allgemeinen Pathologischen Anatomie des Menschen und der Tiere." J. F. Bergmann, Munich, 1927.

⁶Jakob, Heinrich: Tierärztliche Augenheilkunde. Richard Schoetz, Berlin, 1920.

⁷Lesbouyries, M., and Charton: Retinal Detachment in the Dog. Bull. Acad. vét. France, 16, 1943.

⁸Nicholas, Eugene: Veterinary and Comparative Ophthalmology. H. & W. Brown, London, 1914.

⁹Saunders, L. Z.: Congenital Optic Nerve Hypoplasia in Collie Dogs. Cornell Vet., 42, January, 1952.

¹⁰Smythe, R. H.: Veterinary Ophthalmology. 2nd ed. Williams & Wilkins Co., Baltimore, 1958.

The Role of Leptospira Infection in Periodic Ophthalmia in Horses

Of 254 horses 1 to 18 years old, in Romania, affected with iridocyclitis, all had titers of at least 1:100 while 33 per cent had titers of 1:400 or over against *Leptospira pomona*. Two of 3 foals inoculated intravenously with 30 ml. of *L. pomona*, isolated from 2 affected horses, developed periodic ophthalmia. One of these had three attacks in 15 months while in the other, the first attack came eight months after the inoculation.

Periodic ophthalmia was not transmitted to clinically healthy horses kept with 30 affected animals for six months. The iridocyclitis may be part of the clinical syndrome of leptospirosis but it also may result from a complicating, unapparent infection.—S. Danciv et al. in *Inst. path. d'hug. anim.*, 8, (1958): 36.

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Periodic ophthalmia was studied in 26 areas of Romania where it affected 7.5 to 19.8 per cent of the horses. Of 254 affected horses, 33 per cent had positive titers. Two of 3 foals inoculated intravenously with *Leptospira pomona* developed iridocyclitis. One had three attacks in 448 days, the other had its first attack eight months after inoculation.

Iridocyclitis may be a sign of general leptospirosis but it could also be a belated complication by an inapparent infection. It was not transmitted by direct contact with affected horses.—P. Jivoiu et al. in *Epi-zoot., Microbiol., Immunol. Anat. Pat. Gen. (Bucharest)*, 8, (1958): 36.

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All of 23 horses with periodic ophthalmia, in Italy, had *Leptospira* antibodies (13, L.

icterohaemorrhagiae and 10, *L. pomona*). High titers persisted for at least 20 to 30 days after the onset of the ophthalmia then dropped rapidly. They rose with each attack.—*Vet. Bull. (April, 1959): Item 999.*

Periodic Ophthalmia and Parasites

Of 183 horses examined in Yugoslavia, 51 per cent had signs of periodic ophthalmia. Microfilariae of *Onchocerca cervicalis* were found in the corneas of 57.4 per cent, but were about equally divided between horses with and without periodic ophthalmia. It may be concluded that equine corneal filariasis is not a factor in causing this disease.—*J. Dimic et al. in Wien. tierärztl. Monatschr. (May, 1959): 374.*

Leptospira hyos Infection in Swine

In an epizootic of porcine leptospirosis, the course was usually inapparent clinically except for a high percentage of abortions. *Leptospira hyos* was serologically demonstrated in four herds, and in a fifth herd 85 per cent of aborting sows had agglutinins for *L. pomona*. *Leptospira hyos* was cultured from guinea pigs intraperitoneally injected with urine from 3 infected gilts. This is the first isolation of *L. hyos* in Italy.—*R. Farina in Proc. Ital. Soc. Vet. Sci. (1958): 581.*

The Diagnosis and Treatment of Atrial Fibrillation in Horses

The clinical diagnosis of atrial fibrillation in horses is based on the finding of an absolutely irregular heart rhythm, elevated heart rate, pulse deficit, occasional absence of the second heart sound, variation in intensity of the heart sounds and murmurs, and variation in the strength of the pulse. All of these signs are not always present.

Although the heart rate is usually increased, it may be normal or slow. The pulse rate may be less than the auscultatory heart rate when the two are counted simultaneously (pulse deficit). This occurs when the ventricular rhythm is irregular with the result that some contractions follow the preceding systole so closely that sufficient blood has not entered the left ventricle to produce a palpable pulse.

Pulse deficit diminishes or is absent at

slow ventricular rates. The second sound is absent when insufficient blood is in the ventricles at the time of systole to open the aortic and pulmonic valves. The atrial or fourth heart sound is frequently heard in normal horses, but never in the presence of atrial fibrillation, since the atria are not contracting. This is a useful characteristic in distinguishing atrial fibrillation with slow ventricular rate and fairly regular rhythm from incomplete atrioventricular block with dropped beats. In the latter arrhythmia, detection of the fourth heart sound during prolonged diastolic intervals confirms the diagnosis. The diagnosis should be confirmed with an electrocardiogram.

This arrhythmia can usually be abolished in the horse with quinidine sulfate given orally, with a dosage schedule providing for gradually increasing daily amounts from 5 to 88 Gm. in a 13-day period. It has seldom been necessary to go beyond 40 or 50 Gm. daily. A common side effect is swelling of the nasal mucosa and nasal discharge. This may reach the point where breathing is seriously restricted. To date, it has never been necessary to insert a tracheal tube, although in one instance it appeared that this might have to be done. However, the swelling subsided after a few hours. When this complication arises, administration should be stopped until it is certain that there is no further danger. Usually administration can then be continued if necessary. In 1 of 8 horses treated, severe laminitis developed following the treatment.—*D. K. Detweiler, V.M.D., Philadelphia, at Ann. Conf. of Veterinarians, University of Pennsylvania, April 28-29, 1959.*

Activity of Dried Rumen Products

In two feeding and digestion trials with wether lambs, at the South Dakota Agricultural Experiment Station, dried rumen products were added to high and low concentrate rations which contained 7.4 to 12.0 per cent protein. The dried rumen products apparently had no stimulatory effect on the lambs' rate of gain, feed consumption, or on the digestibility of major nutrients. *In vitro* digestion trials also showed no replacement value or additive benefits for dried rumen products.—*J. Anim. Sci. (May, 1959): 849.*

Canine Sebaceous Gland Carcinoma

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THIS ARTICLE was written with a twofold purpose: to discuss the canine sebaceous gland carcinoma, as well as interesting features of differential diagnosis.

Sebaceous gland carcinomas are small wartlike growths which originate at multiple sites. Most grow from 2 to 8 cc. but some are as large as 75 cc. They are lobulated, hard, and yellow or white. The surface is often ulcerated and the cut section is mottled with either red or brown pigments.⁶

Breeds usually affected with sebaceous gland neoplasms are the Fox Terrier, the Cocker Spaniel, and the German Shepherd Dog. The growths commonly appear on the head, feet, and thorax; however, they can appear at any location and males are predisposed.⁶

This carcinoma is mildly malignant, *i.e.*, it may or may not spread.^{2,6} It is similar to the disease in man.¹ Modified sebaceous glands of the circumanal type are also capable of metaplasia.⁴

DIFFERENTIAL DIAGNOSIS

Clinically, this carcinoma can be confused with several entities; distinguishing characteristics are given (table 1). Simple warts may look like the early-stage carcinomas. However, warts are usually found on young dogs, whereas carcinomas occur in old dogs. In addition, canine warts are contagious.³

Skin forms of blastomycosis can resemble sebaceous carcinomas, especially when a tumor becomes infected and is draining. Co-existence of pulmonary disease cannot be relied upon for differentiation, as skin blastomycosis can occur alone and independent of any systemic reaction. However, culture of exudate on Sabouraud's agar will produce *Blastomyces* growth in eight or more days.⁷ The intra-dermal test may be of value in this differentiation.

Sebaceous cysts⁵ can easily be confused with sebaceous carcinomas. Clinical differentiation would be rather difficult; however, cysts are not usually as numerous as are the carcinoma sites. Cysts tend to be thin-walled, while the carcinomas are solid

TABLE 1—Sebaceous Gland Carcinoma Versus Other Diseases in Dogs

Disease*	Differential features
Warts	Contagious; occur in young dogs.
Blastomycosis	Presence of co-existing lung or bone pathological changes; growths not as numerous; Sabouraud's agar culture; skin test.
Sebaceous cysts	Thin-walled; growths usually not as numerous; histopathological study.
Sebaceous carcinoma	Solid mass; occurs in older dogs (males); multiple sites of origin; histopathological study.

*All may be accompanied by secondary bacterial infection.

masses. Treatment in all cases would consist of removal, at which time the growth can be sent to a laboratory for histological verification.

CASE REPORT

A female Cocker Spaniel, 7 years old, was examined because several skin growths had appeared during three to four months. Examination of the skin revealed several small wartlike growths on various parts of the body. Of the two largest growths, one was over the lumbar region, and another on the thigh.

The largest growths, measuring from 5 to 10 cc., were hard and fibrous. The base did not appear to be infiltrating subcutaneously and the margins were irregular. Both growths had a distinct central core which discharged pus. Staphylococcal infection or blastomycosis was suspected. Bacteriological examination of pus specimens was positive for *Staphylococcus* spp., but negative for *Blastomyces* spp.

There appeared to be no systemic abnormalities. There was a slight lameness in

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one hindleg which responded to one intramuscular injection with 30 mg. of prednisone. No correlation with the skin condition was attributed to the lameness.

Of the diagnostic possibilities, the condition seemed to be either sebaceous cysts or sebaceous carcinoma. Therefore, penicillin and streptomycin were given to combat the infection and the two largest tumors were surgically removed and sent to a laboratory.*

The specimens were reported to be sebaceous gland carcinomas; the description read:

The tissues have the basic structures of islands and lobules of sebaceous glands but the units are much larger than normal. The islands consist of cells which overlap each other, having enlarged round, oval, or oblong nuclei. These are greatly increased in volume in relation to the volume of cytoplasm. Mitotic figures are numerous.

... The Cocker Spaniel is commonly affected with neoplasms of the sebaceous glands. They are not usually regarded as prone to metastasize, but multiple sites of origin are common. Ulceration of the surface of these tumors is frequent.²

Treatment rendered in this case appears to have been successful. The infection was eliminated, and four months after excision of the growths, smaller ones had not enlarged and no new ones had appeared.

SUMMARY

Canine sebaceous gland carcinomas are small, mildly malignant neoplasms which arise at multiple sites of origin. They must be differentiated from several other conditions, especially warts, blastomycosis, and sebaceous cysts.

A case report is presented discussing multiple lesions on a Cocker Spaniel, that proved to be sebaceous gland carcinoma complicated by staphylococcal infection of the two largest tumors. These were excised and penicillin-streptomycin was given. Four months later, infection had not recurred, the remaining tumors had not grown larger, and no new tumors had appeared.

References

- ¹Boyd, William: A Textbook of Pathology. 6th ed. Lea and Febiger, Philadelphia (1953): 962.
- ²Corcoran, James B., School of Veterinary Medicine, Oklahoma State Univ., Stillwater: Personal communication, 1958.
- ³Hagan, W. A., and Bruner, D. W.: The Infectious Diseases of Domestic Animals. 2nd ed. Comstock Publishing Associates, Ithaca, N.Y. (1951): 886.
- ⁴Hayes, F. A., and Seibold, H. R.: Carcinoma of Modified Sebaceous Gland Origin in Forelimb of a Dog. J.A.V.M.A., 129, (Dec. 15, 1956): 576.
- ⁵Kirk, Hamilton: Index of Diagnosis. 4th ed. Williams & Wilkins Co., London (1953): 487.
- ⁶Mulligan, R. M.: Neoplasms of the Dog. Williams & Wilkins Co., Baltimore (1949): 31, 46, 54.
- ⁷Newberne, J. W., Neal, James E., and Heath, M. K.: Some Clinical and Microbiological Observations on Four Cases of Canine Blastomycosis. J.A.V.M.A., 127, (Sept., 1955): 220-223.

Treating Cecal Impaction in Horses

Of 154 cases of cecal impaction in the horse, in Poland, 140 were successfully treated as follows: When the cecal contents were soft, 8 to 10 liters of 5 per cent sodium sulfate was given by stomach tube twice daily, adding 150 to 200 Gm. of yeast with the second dose and injecting 20 ml. of atropine subcutaneously. When the contents were hard, 2 kg. (about ½ gal.) of liquid paraffin was given with the first dose of sodium sulfate and half as much with the second dose. Dehydrated animals were also given 1,000 ml. of 5 per cent glucose intravenously.

All of 16 horses which did not respond to such treatment recovered when 200 to 300 ml. of warm liquid paraffin was injected directly into the cecum, either through the flank or through the rectum.—*Vet. Bull. (June, 1959): Item 1871.*

Equine Encephalomyelitis During 1958

During 1959, 2,054 cases of infectious equine encephalomyelitis, resulting in 494 deaths, were reported. The number of cases has gradually doubled since 1954, but is dwarfed by the 184,662 cases reported in 1938. The lowest number reported in 24 years was 762 cases in 1951.—*Bull., ARS, U.S.D.A., June 3, 1959.*

Shipping Fever

While being transported on a ship, about half of 76 cattle developed shipping fever and 11 died; *Pasteurella multocida* was isolated from the lungs of the 3 examined. The others recovered after being treated with streptomycin and sulfadimidin.—*P. Grmovsek in Vet. Glasnik, 13, (1959): 543.*

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Tetany in Cattle on Winter Rations. Part II. Stresses and Mineral Metabolism

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CAUSES OF TETANY in cattle are usually discussed in reference to particular conditions of occurrence, but most explanations involve a balance between two viewpoints.⁵ At one extreme, tetany is believed to involve neural or endocrine disorders¹⁰ induced by environmental or other stresses,^{1,8,10,22} including toxic effects.¹⁰ Various stresses are thought to cause physiologic dysfunction, with failure of serum regulatory mechanisms, followed by tetany.^{1,5,10,18}

In the opposing view, factors limiting calcium¹³ or magnesium intake are emphasized.^{9,11,17,20,21} Digestive or metabolic disturbances resulting from sudden changes¹⁰⁻²¹ or adverse content^{9,18} of the diet are considered nutritional stresses.

FACTORS OF OCCURRENCE

It has been stated that hypomagnesemia, with or without tetany, can occur at any time in cattle, either when on grass or stall-fed, and is not confined to any particular age, sex, or breed.^{1,2} Uniform incidence in regard to these factors is not implied. In England, hypomagnesemia is most common in spring and autumn when cattle are pastured on lush grass, and is least common in the summer, although the incidence in beef cattle, dry cows, and heifers is said to be higher in winter than in spring.¹ Tetany is rare in bulls or steers.^{4,5,15} The incidence of tetany among Jersey cows in Britain appears to be less than in other breeds²—a reversal of the breed tendencies in parturient paresis.¹²

Cases of "winter tetany" are usually associated with recent parturition,¹⁵ but the postparturient intervals vary with conditions. In an English study of 406 hypomagnesemic cases, 36 per cent occurred within four days after parturition and 80 per cent developed within 60 days.⁵ This distribu-

tion is more representative of the winter tetany cases observed here in 1955 to 1957¹⁵ than of the cases in the herd reported in this paper (table 1). Two cows (262 and 91) were affected once before, and twice after, parturition in 1957. Cow 250, when eight months pregnant, showed signs of tetany during handling in an auction sale ring and was found dead the next morning. In each case, as with cow 75, these cows had been affected after parturition when two years younger.

Tetany is rare in any breed of cows during the grazing season in western Maryland, regardless of parturition date. In the herd and period under study (table 1), parturitions usually occurred in March or April. Only cows 3, 4, and 208 calved later than June. These cows were not affected during the grazing season, but were the only cows which developed tetany more than one month after parturition, and before March.

AGE AS A FACTOR

An increased incidence of tetany roughly proportional to the number of parturitions (or age) has been reported.^{3,5,15} One report indicates that cows which have had more than 6 calves are 14 times as likely to be affected as those fresh one time.⁵ Progressively less favorable responses to treatment have been observed in cows affected in several different years.²²

Hypocalcemic tendencies apparently develop at a later age⁴ and increase at a much sharper rate than hypomagnesemic tendencies. The decrease in blood calcium levels in normal cows at parturition is said to be deeper and steeper with increasing age, and is inversely related to blood magnesium levels.¹⁶ In data from an English study³ of 406 animals with clinical cases of hypomagnesemia, no hypocalcemia was reported in affected pregnant heifers; concurrent hypocalcemia was found in half of the cases occurring during the first lactation. In the fourth lactation, hypocalcemia was present in 3 of each 4 hypomagnesemic

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cows, and the proportion increased with each additional lactation.

Mixed influences of age and other factors are suggested in table 1. Only 3 of 16 cows were less than 8 years old when first affected. Old cows, which were unaffected before 1957, may have become more susceptible with age; however, the importance of other factors is indicated in the cases of cows 75, 274, and 91, which escaped tetany in 1956. A decreased interval between parturition and onset of tetany may also reflect unusual stress or a lengthened influence of winter conditions before parturition, as well as effects of age.

WEATHER STRESSES

Various stresses have been suspected of inducing or favoring tetany; some, such as weather factors, apply to all animals in a herd. Increased incidence after periods of cold, wet, cloudy, or windy weather has been suggested,^{13,20,22} and may relate to increased loss of body heat or decreased food intake under such circumstances.¹⁹⁻²¹ The physiologic effects of such stresses and nutritional factors may result in the frequently reported^{1,18,22} occurrence of hypomagnesemia in herds of unsheltered cattle.

In cattle having access to good shelter, and subsisting on hay rather than pasture, the incidence of tetany in animals in 1955 and 1957¹⁵ was found to be high on particular days or groups of days. Correlation of

these occurrences with daily minimum and maximum atmospheric temperatures showed that in 11 of 12 instances the incidence peaks were preceded, within 24 hours, by a sharp drop in temperature, either mean or diurnal. In the twelfth instance, a rise of 40 degrees was recorded in the previous 12 hours.

Early observers suggested that low barometric pressure may predispose to tetany^{10,19} by inducing hyperventilation leading to alkalosis.⁸ Hypocalcemic tetany in man has followed alkalosis caused by hyperventilation attending fever, anoxia, or hysteria.²³ Normal values for total serum calcium may be found with tetany in man if ionized calcium levels are decreased by alkalosis.⁷ Perhaps the tetanogenic effects of fear and excitement^{15,19} or forced exercise²² on cattle may be partially attributed to hyperventilation, although possible effects of increased body temperature may apply.

REPRODUCTIVE STRESSES

Changes in blood electrolyte concentrations have been associated with parturition in normal cows. Decreases in serum calcium and phosphorus levels from normal at two days before parturition to minimum levels one day postpartum have been reported.¹⁶ Eight hours after decline of calcium levels, magnesium levels rose to

TABLE 1—Age, Parturition Date, Treatment, and Disposition Records for All Suspected Cases of Clinical Tetany in One Herd of Hereford Cows

Cow No.	Age (yr.)	Parturition dates	Dates of treatment	Disposition
250	8	4/18/55	4/18,* 4/19,* 4/20*	("Berserk" in sale ring, dead next morning — 3/57.
	9	4/23/56	4/23	
	10	due 4/57*	-----	
3	9	3/20/55	3/20	Sold 1/57.
	10	7/8/56	12/11, 12/15	
75	5	3/18/55	3/23,* ** 3/24,* 4/14*	Sold 1957.
	7	4/10/57	4/10	
274	7	3/10/55	3/12, 3/13, 3/16	Died in stockyard.
	9	4/13/57	4/14, 4/16, 4/28	
91	4	3/31/55	4/16*	Sold 11/57.
	6	4/8/57	4/4, 4/9, 11/11	
10	8	3/29/55	4/10,* †, 4/15*	Sold 1957.
224	9	4/11/55	4/13,* 4/15,* 4/17*	Sold 1956.
11	8	4/1/56	4/2	Died 4/3/56.
208	11	8/20/56	12/5, 12/8	Shot 12/11/56.
4	10	9/5/56	-----	Died 11/56.
14	10	4/10/57	4/10, 4/14, 4/17‡	Sold 4/18/57.
262	10	4/3/57	4/2, 4/3, 4/25	Sold 1957.
9	11	4/9/57	4/10	Sold 1957.
278	9	4/2/57	4/13, 4/16	Sold 1958.
241	11	4/4/57	4/14, 5/5, 5/7	Sold 1957.
256	10	4/5/57	4/27, 5/7	Sold 1957.

*Estimated date; **serum calcium 4.6 mg./100 ml., serum magnesium less than 0.1 mg./100 ml.;¹⁵

†serum calcium 5.2 mg./100 ml., serum magnesium less than 1.0 mg./100 ml.;¹⁵ ‡serum calcium 9.1 mg./100 ml., serum magnesium 1.7 mg./100 ml.¹⁵

slightly above normal, reaching peaks which coincided with minimum calcium concentrations.¹⁰

Electrolyte changes are probably influenced by parturient endocrine alterations, but similar changes in serum concentrations have been reported in cows starved 48 hours.¹¹ Magnesium levels are said to be decreased at parturition—or during estrus—when the time spent in grazing is decreased.²¹ Stresses accompanying labor, blood loss, and sudden internal displacements following parturition may also affect blood electrolytes through changes in respiratory patterns and blood pressure or volume.

The increased incidence of tetany during estrus¹⁹⁻²¹ may be influenced by endocrine and nutritional changes, but postparturient incidence is additionally related to increased calcium and magnesium requirements. A 90-lb. fetus may contain nearly 25 Gm. of magnesium and over 700 Gm. of calcium,⁵ of which a disproportionate amount is required for rapid growth in late gestation. It has been suggested that calcium withdrawal attending multiple pregnancies and lactations may contribute to severe negative calcium balances in late pregnancy.¹³ Calcium and magnesium become concentrated in colostrum at the expense of serum stores¹² at a time when nutritional intake may be decreased.²¹

The highest rate of tetany incidence occurs in the early postpartum period^{3,4,13} when losses of calcium¹³ and magnesium in milk may be sufficient to precipitate tetany. Negative balances of both calcium and magnesium have been reported in early lactation.⁵ The possibilities of hypomagnesemia during high milk production are suggested by calculations showing the minimum net magnesium requirement of a cow producing 50 lb. of milk to be slightly more than twice the 2.41 Gm. needed for body maintenance plus production of 10 lb. of milk.⁵ Tetany is observed in dry non-pregnant cows and bulls; therefore, it is not necessarily associated with parturition or lactation,^{1,8,19} but it seems logical that the principal subject is the postparturient cow.

EFFECT OF AGE ON BONE

Although 60 per cent of normal bone magnesium content may be missing in calves dying of tetany,^{5,6} bones of adult

victims show little or no depletion.⁵ Some of this difference with age can be explained on the basis that in infants the bone surface available for mineral exchange is extremely large, whereas in adults much of the bone is metabolically inert.⁵ Radioautographic studies indicate that rapid mineral exchange is limited to areas of bone formation, which in the adult result largely from the slow but constant reorganization of bone.¹⁴

Bone crystals are currently thought to be lattices of hydrated calcium triphosphate or hydroxyapatite in which magnesium and other ions exist as impurities trapped during formation, or as hydrated ions held by surface charges.¹⁴ In formative bone, the individual crystals are so tiny that the resulting enormous surface may hold water of hydration in volume exceeding that of the crystals.¹⁴ Where the crystal surface-to-mass ratio is large, the proportion of trapped magnesium ions is low and the surface ions are readily exchangeable in the water of hydration. Recently formed bone of calves may thus be easily depleted in the absence of adequate magnesium intake. Larger, closely packed, and dehydrated crystals of dense bone undergo little ion exchange, except when dissolved under the influence of parathormone, vitamin D, and cellular activity.¹⁴ Undepleted adult tetany victims are apparently unable to adequately mobilize their bone minerals.

IMPORTANCE OF ION EXCHANGES

The age-wise increase in both hypocalcemia and hypomagnesemia^{3,6} probably reflects progressively diminishing ion exchange potential. It has been suggested that parturient paresis results from mammary gland withdrawal of calcium from circulation at a faster rate than skeletal reserves can be mobilized.¹² Parathyroid response being relatively slow,¹⁴ it is probable that this acute need must be largely met by the reserves of exchangeable calcium.¹² With successive lactations, an increased udder capacity may lead to more acute hypocalcemia, while lessened bone formation restricts the amount of exchangeable calcium and magnesium available for replacement.

Concepts of surface retention of ions may clarify some of the reciprocal relationships of calcium and magnesium. It has long been known that intravenous

TABLE 2—Age, Parturition, and Disposition Records for Unaffected Cows Kept in One Herd During a Period of Tetany Occurrences

Cow No.	Parturition dates			Age (yr.) 1957	Status, spring, 1959
	1955	1956	1957		
1	4/15	4/1	4/10	13	Age 15.
2	12/10	none	4/21	12	Sold.
252	3/17	3/28	4/14	10	Sold.
263	4/29	6/1	5/6	10	Sold.
266	4/14	4/23	4/18	10	Sold.
47	3/12	4/2	4/5	7	Age 9.
70	3/20	6/4	4/14	7	Age 9.
72	3/20	4/4	4/18	7	Age 9.
83	4/17	3/28	4/8	6	Age 8.
96	3/27	3/30	4/20	6	Age 8.

introduction of either calcium or magnesium ions may result in loss of the other ions.²³ Depletion of magnesium from bone is much more rapid than replacement in both rats and calves, probably because magnesium lost from bone is replaced by calcium.⁵ During hypomagnesemia with normal calcium levels,⁶ relative excesses of calcium ions apparently cause mass action displacement of magnesium from the hydrated ion reserves on bone crystal surfaces. Failure to restore exchangeable magnesium may partially account for the transitory benefits of intravenous magnesium solutions in treatment of calf tetany.⁶ When hypocalcemia is superimposed on hypomagnesemia as a preliminary to tetany,²² calcium ions may be exchanged for sodium ions, which are known to penetrate the surface ion layer by displacing calcium ions.¹⁴

If tetany is assumed to follow concurrent depletion of exchangeable calcium and magnesium¹⁵ relative to increased body demand, then dual replacement therapy is indicated. Combined administration of calcium and magnesium has been advised for tetany treatment,^{1,18,19} but calcium salts

alone are usually effective.^{10,22} Likewise, unaided magnesium solutions have been recommended.^{4,8,10} Elimination of either deficit can apparently stop tetany in some cases, but the secondary importance of magnesium replacement for relief of tetany signs is indicated by the occurrence of non-clinical^{15,18,19} hypomagnesemia. Therapeutic concentrations of calcium salts may temporarily raise blood magnesium levels by displacement of remaining available magnesium. The larger requirement for calcium probably limits the effectiveness of calcium displacement by excess magnesium.

INDIVIDUALITY

Individual variation in degree of hypomagnesemia in cows under similar management has been observed in both natural and experimental cases.² Some of this variation may be related to age and bone differences, but individual dissimilarity of magnesium utilization¹⁷ may be involved. Individual differences in calcium absorption and internal metabolism or tolerance for decreased serum concentrations have been suggested.¹²

Some cows are apparently better able than others to resist the effects of age and other factors which may increase incidence of tetany. Of 33 cows over 4 years old in 1955 (table 1), 16 are thought to have had signs of tetany. Ten cows (table 2) kept in this herd under similar conditions were normal throughout three years of tetany occurrences. Seven cows sold before 1957 were unaffected by tetany in 1955; only 1 was then less than 8 years old. Possible examples of individual differences in susceptibility are shown (table 3).

CONCLUSIONS

1) Bovine tetany occurs when the sum of various factors is sufficient to cause low blood levels of calcium and magnesium ions at the same time.

2) Tetany usually follows a period of increased calcium and magnesium requirements of the fetus and, later, of the mammary glands.

3) Mineral intake may be limited by reduction of food intake during stress, by poor availability in the ration, or by faulty assimilation.

4) Decreased barometric pressure, or other factors favoring alkalosis, may

TABLE 3—Difference in Susceptibility to Tetany, Independent of Age, in Cows Under Similar Conditions of Management and Parturition

Cow No.	Age (yr.)	Parturition date	History
75	5	3/18/55	Treated 3 times after parturition.
70	5	3/20/55	No tetany through age 9 years.
252	8	3/17/55	No tetany through age 10 years.
91	6	4/8/57	Treated once before, twice after parturition.
83	6	4/8/57	No tetany through age 8 years.
1	13	4/10/57	No tetany through age 15 years.

reduce the effective number of ions in the blood.

5) Magnesium reserves in the bone are reduced early in life and are readily displaced by calcium, which also tends to become less rapidly available with increased age.

6) Susceptibility of individual animals to factors favoring tetany is variable; differences in parturient stress or in adaptability to continued depletion may be involved.

7) A combination of known factors with special factors related to winter conditions in western Maryland may account for the occurrence of tetany either before, or as much as five months after, parturition.

References

- ¹Allcroft, Ruth: Hypomagnesaemia in Cattle. *Vet. Rec.*, 66, (1954): 517-522.
- ²Allcroft, Ruth: Hypomagnesaemia, A Summary of Evidence. *Agric. Rev.* (Dec., 1955): 1-4.
- ³Allcroft, W. M.: Observations on Some Metabolic Disorders of Cows, as Evidenced by Chemical Analysis of Samples of Blood from Clinical Cases. 1. Conditions of Occurrence. *Brit. Vet. J.*, 103, (1947): 2-11.
- ⁴Barker, J. R.: Blood Plasma Changes and Variations in the Female Bovine Toxemias. *Vet. Rec.*, 51, (1939): 575-580.
- ⁵Blaxter, K. L., and McGill, R. F.: Magnesium Metabolism in Cattle. *Vet. Rev. & Annotations*, 2, (1956): 35-55.
- ⁶Blaxter, K. L., and Sharman, C. A. M.: Hypomagnesaemic Tetany in Beef Cattle. *Vet. Rec.*, 67, (1955): 108-115.
- ⁷Cantarow, A., and Trumper, M.: *Clinical Biochemistry*. 5th ed. W. B. Saunders, Philadelphia (1955): 228.
- ⁸Dryer, H.: Lactation Tetany. *Vet. Rec.*, 12, (1932): 1163-1169.
- ⁹Ender, F., Dishington, I. W., Helgebostad, A., and Martinsons, E.: The Magnesium Problem in Relationship to the Tetany Paresis Syndrome in Dairy Cows. *Nord. Vet.-med.*, 9, (1957): 881-917.
- ¹⁰Green, H. H.: Recent Advances in Our Knowledge of Diseases Associated with Mineral Balance in the Blood of Ruminants. *Vet. Rec.*, 51, (1939): 1179-1198.
- ¹¹Halse, K.: Hypocalcemia Accompanied by Changes in Blood Magnesium in Starving Cows. A Preliminary Report. *Nord. Vet.-med.*, 10, (1958): 1-8.
- ¹²Marshak, R. R.: Studies on Parturient Paresis in Dairy Cows with Particular Reference to Udder Insufflation. *J.A.V.M.A.*, 128, (May 1, 1956): 423-431.
- ¹³Marshak, R. R.: Some Metabolic Derangements Associated with Magnesium in Cattle. *J.A.V.M.A.*, 133, (Dec. 1, 1958): 539-542.
- ¹⁴McLean, F. C.: The Ultrastructure and Function of Bone. *Science*, 127, (1958): 451-456.
- ¹⁵Mershon, M. M., and Custer, F. D.: Tetany in Cattle on Winter Rations. Part I. A Clinical Report. *J.A.V.M.A.*, 132, (May 1, 1958): 396-400.
- ¹⁶Moodie, E. W., Marr, A., and Robertson, A.: Serum Calcium and Magnesium and Plasma Phosphate Levels in Normal Parturient Cows. *J. Comp. Path. and Therap.*, 65, (1955): 20-36.
- ¹⁷Rook, J. A. F., and Balch, C. C.: Magnesium Metabolism in the Dairy Cow. II. Metabolism During the Spring Grazing Season. *J. Agric. Sci.*, 51, (1958): 199-217.
- ¹⁸Simesen, M. G.: Hypomagnesaemia-Grasstetani. *Nord. Vet.-med.*, 9, (1957): 305-321.
- ¹⁹Sjollem, B., Van Koetsveld, E. E., Grashuis, J., and Lehr, J. J.: Investigations into Grass Tetany. II. *Tijdschr. Diergeneesk.*, 80, (1955): 1111-1134.
- ²⁰Swan, J. B., and Jamieson, N. D.: Studies on Metabolic Disorders in Dairy Cows. II. Observations on the Aetiology of Metabolic Disorders in Four Waikato Dairy Herds. *New Zealand J. Sci. and Tech.*, 38, (1956): 316-325.
- ²¹Swan, J. B., and Jamieson, N. D.: Studies on Metabolic Disorders in Dairy Cows. III. The Effects of After-Calving Under-Feeding and of Thyroprotein Dosing on the Level of Serum Magnesium in Dairy Cows. *New Zealand J. Sci. and Tech.*, 38, (1956): 363-382.
- ²²Udall, R. H.: Low Blood Magnesium and Associated Tetany Occurring in Cattle in the Winter. *Cornell Vet.*, 37, (1947): 314-324.
- ²³West, E. S., and Todd, W. R.: *Textbook of Biochemistry*. 2nd ed. MacMillan Co., New York (1957): 632, 1254.

Fat in Swine Rations

The main sources of energy for swine are the fats and carbohydrates in the grain portion of the rations. Since most grains contain only 2 to 5 per cent fat, most of the energy comes from the starches and sugars. Stabilized animal fat can supply 2.25 times as much energy as the same amount of corn.—*Feed Bag* (Feb., 1959): 75.

Tranquilizers and Growth of Chicks

Chlorpromazine fed to chicks at levels of 10 to 100 mg./kg. of feed, at the University of California, resulted in a slight but significant increase in growth at 24 days of age, whereas levels of 250 to 16,000 mg./kg. depressed growth and 16,000 mg./kg. resulted in 100 per cent mortality by 24 days of age.

Reserpine fed to chicks at 0.5 mg./kg. of feed resulted in a slight but significant increase in growth, whereas levels of 5 to 500 mg./kg. depressed growth and 500 mg./kg. resulted in a 96 per cent mortality by 24 days of age.—*Poult. Sci.* (May, 1959): 508.

Dr. Arthur Freeman Joins AVMA Staff

The appointment of Dr. Arthur Freeman as assistant editor effective September 14, 1959, was announced at the 96th Annual Meeting in Kansas City, Mo.

Dr. Freeman was born Jan. 12, 1925, in Youngstown, Ohio, attended public schools there, and entered military service in 1943. He was separated from the U. S. Air Force



Dr. Arthur Freeman

three years later, having served as a bombardier. He then was associated with the U. S. Fish and Wildlife Service in Alaska for several years, where he worked with wildlife biologists, an experience contributing to his decision to continue his education in the bio-medical field. He headed the first winter research project carried out in the western Kodiak area. He met pre-veterinary requirements by attending Stanford University in California and Ohio State University's College of Agriculture. He received his veterinary degree at Ohio State University in 1955. During his veterinary school years, Dr. Freeman worked

with sterility diseases of cattle in the Agricultural Research Service program which provided for a tour of duty at the Beltsville Animal Disease Station, with the Meat Inspection Division at Denver, Colorado, and in regulatory work in the state of Wisconsin.

He was a member of Phi Zeta and Alpha Psi fraternities and the AVMA student chapter. He was editor of "The Speculum," the veterinary student publication, and in 1955 he received the Dean's Speculum Award for his editorial contributions. Also in 1955 he received the AVMA Auxiliary Award which is given to a senior student adjudged to have done the most to promote the interests of the profession during his school career.

Following graduation, Dr. Freeman practiced at Bellingham, Washington, where his calls to remote areas were regularly made by airplane. In 1957 he became associated with Jensen-Salsbery Laboratories where he was director of professional relations and editor of *Jen-Sal Journal*, *Jen-Sal Therapy Bulletin*, and *Jen-Sal Small Animal Topics*.

As editor of the *Jen-Sal Journal* in 1957, he received a First Award for Editorial Achievement from the International Council of Industrial Editors in competition with over 900 other publications. During this time he developed a simplified rapid plate serological test for leptospirosis.

He is a member of the Kansas City V.M.A., the Missouri V.M.A., the AVMA, the American Association of Industrial Editors, and the Ohio State University Association.

Dr. Freeman married the former Marilyn Werner of Portsmouth, Ohio, and they now have one boy age 1½ years.

Abstracts

Cataracts in Chickens with Lymphomatosis

The eyes in a group of 29 chickens with lymphomatosis have shown a high percentage of cataracts. Associated with this degeneration in the lens is an iritis and iridocyclitis characterized by an infiltration of lymphocytes. Ocular lesions are known to occur in chickens infected with the virus of lymphomatosis; however, degeneration of the lens with typical cataracts apparently has not been considered as a characteristic manifestation of this infection.

The lesion in the lens is characterized by either a focal or diffuse degeneration. The lens fibers apparently undergo coagulation necrosis, followed by cyst formation. There is no inflammatory reaction associated with the degeneration. The epithelial cells in the lens capsule may proliferate in focal areas and project into the degenerated areas of the lens. Fibroblasts in the lens capsule may also proliferate and extend into the degenerated lens. The retina may become detached and, in old lesions, osteoid tissue may develop within the posterior chamber. The virus may enter the lens from contaminated fluid present in the anterior chamber.

Chickens showing these lens lesions usually have an associated iritis. Some of the birds also show the lesion of visotropic and neurotrophic lymphomatosis. The pathologic changes are illustrated by photomicrographs.—[R. H. Rigdon: *Cataracts in Chickens with Lymphomatosis*. *Am. J. Vet. Res.*, 20, (July, 1959): 647-654.]

Antibiotics and Semen Production in Rabbits

Twelve male rabbits were randomly allotted to four groups of 3 each. Groups 1, 2, and 3 were injected daily intramuscularly with therapeutic doses of oxytetracycline, 2 mg.; procaine penicillin, 4,000 units; and streptomycin, 40 mg./kg. of body weight for three weeks. The fourth group served as controls.

Semen was examined for volume, concentration, percentage of live, percentage of normal, and survival during storage, from weekly collections for two months pretreatment, during treatment, and five weeks post-treatment. The antibiotics did not induce beneficial or harmful effects on semen production or quality.—[Tim Bhannasiri, Ralph Bogart, and Hugo Krueger: *The Effect of Antibiotics on Semen Production in Rabbits*. *Am. J. Vet. Res.*, 20, (July, 1959): 756-759.]

Cardiac Changes in Cattle with Brisket Disease

A study was made to determine the location and degree of gross cardiac changes within the hearts of 41 cattle with clinical cases of high mountain (brisket) disease; 39 cattle residing at high altitudes; and 39 cattle residing at low altitudes.

Study of hearts from animals with clinical cases of high mountain disease revealed a marked right ventricular hypertrophy with mild hypertrophy of the septum.

Experimentation showed that continuous residence at high altitude caused mild, but statistically significant, hypertrophy of the right ventricle.

Chronic hypoxia is postulated to be a causative factor in the development of the right ventricular hypertrophy.

In the quantities given, showers of autogenous fibrinous emboli into the pulmonary vascular system caused no significant cardiac hypertrophy.—[A. F. Alexander and Rue Jensen: *Gross Cardiac Changes in Cattle with High Mountain (Brisket) Disease and in Experimental Cattle Maintained at High Altitudes*. *Am. J. Vet. Res.*, 20, (July, 1959): 680-689.]

Anthelmintic Studies on Ascaridia in Chickens

Carbon-14 was present in the tissues and excreta of the host as well as in the roundworms. In the host, the greatest uptake of C^{14} expressed as CCl_4 was in the ceca, 6.9 mg. CCl_4 /100 Gm. of tissue. The smallest uptake occurred in the testes, 0.6 mg. CCl_4 /100 Gm. of tissue. The average uptake by the roundworms, 62.6 mg. CCl_4 /100 Gm. of worms, was greater than the uptake of any host tissue. Carbon-14 appeared in the host excreta 15 minutes after treatment.—[C. J. Terbaar, M. F. Hansen, R. E. Hein, and R. H. McFarland: *Anthelmintic Studies with Carbon 14-Labeled Carbon Tetrachloride on Ascaridia Galli (Nematoda) and Its Chicken Host*. *Am. J. Vet. Res.*, 20, (July, 1959): 662-664.]

Effect of PABA on an Arsenical Agent Fed Chicks and Poults

Both chicks and poults were used to determine if the prior administration of para-aminobenzoic acid (PABA) protects against the effect of a toxic dose of 3-nitro-4-hydroxyphenylarsonic acid (3-nitro). PABA was introduced into the crop one half hour before the administration of an equal weight of 3-nitro.

Treatment increased survival time of chicks given 3-nitro at the level of 100 mg./kg. of body weight and significantly reduced mortality at the 200-mg./kg. level. PABA did not influence mortality in poults receiving 50 and 80 mg. of 3-nitro/kg. of body weight. There was no mortality in the poults receiving 40 mg. or less of 3-nitro/kg. of body weight.—[F. D. Wharton, J. C. Fritz, R. B. Schoene, and M. J. Smidt: *The Effect of Para-Aminobenzoic Acid on the Toxicity of 3-Nitro-4-Hydroxyphenylarsonic Acid in Chicks and Poults*. *Am. J. Vet. Res.*, 20, (July, 1959): 655-658.]

Colonic Intussusception in the Mouse

Though intussusception has not previously been known in the mouse (*Mus musculus*), 14 cases are reported here, showing invagination of the anterior

or colon into the posterior, leading to death. Ages varied from 1 to 14 months. There were 6 males and 8 females, some lactating. No obstructing agent was discovered. All possessed the color gene a^0 obtained in an x-ray experiment, but less than 3 per cent of such mice were affected. Hereditary predisposition is indicated but cannot be simple.—[W. F. Hollander: *Colonic Insusception in the Mouse*. *Am. J. Vet. Res.*, 20, (July, 1959): 750-752.]

Foreign Abstracts

Variant Hog Cholera Virus

After a review of the literature on variant strains of hog cholera virus, the author describes tests of the immunological properties of a Chinese strain. It was concluded from experiments with the virus in simultaneous and crystal violet vaccination that the Chinese strain had a high degree of virulence, but that it was not a new immunological type of the virus.—[P. S. Solomkin et al: *On the Question of the Plurality of Hog Cholera Virus*. *Veterinariya*, 36, (Feb., 1959): 45-48.]—ROBERT E. HABEL.

Signs of Impending Bovine Abortion

During the first half of gestation in the cow, abortion was considered certain when the fetus did not react to palpation per rectum, and when fetal fluids were reduced in amount.

Abortion was almost certain to occur in the presence of: trichomonad vaginitis, inflammation of Gartner's ducts, fluid mucus in the vagina and cervix, and open cervix with shrunken mucosa and absence of sticky secretion.

Abortion usually followed when the volume of fluid in the uterus, especially in the nonpregnant horn, was either too large or too small; erection of the uterus when palpated was either stronger or weaker than normal; firmness of the corpus luteum was increased; the caruncles were prematurely enlarged and reduced in number; and the pulse in the middle uterine artery was weak.—[N. V. Rumyantsev: *Clinical Signs of Pathological Pregnancy*. *Veterinariya*, 36, (March, 1959): 33-35.]—ROBERT E. HABEL.

Induced Leptospirosis in Lambs

A 10- to 12-day-old culture of *Leptospira icterohaemorrhagiae* of serologic type I (Lyubashenko) containing 80 to 90 leptospiras per microscope field was administered by mouth. Two lambs, 30 and 45 days old, were given a single dose of 200 ml. and did not contract the disease. One lamb 45 days old was given 20 to 30 ml. daily for six days. It did not show clinical signs of leptospirosis, but 13 days after the last dose it had a serum titer of 1:800. Two lambs 20 days old were given 5 to 50 ml. of culture daily for five to six days and both

died on the eighth day after the first dose.—[A. G. Aliiev, *Azerbaidzhan Agric. Inst.: On the Pathogenesis of Leptospirosis of Sheep*. *Veterinariya*, 36, (April, 1959): 41-42.]—ROBERT E. HABEL.

Books and Reports

Immunity and Virus Infection

This book reviews the mechanism of immunity and virus infection from the standpoint of basic research and biological and clinical investigations. The section devoted to immunity deals with theoretical considerations of antibody formation based on clonal selection at the cellular level, and on the role of antigen at the molecular level.

New concepts pertaining to immunological reactions, the allergic state, and immunological diseases are also discussed. A good part of this section is devoted to a discussion of the genesis of fever in infection, the properdin system, and the phenomenon of immunological tolerance. The latter may well be of far-reaching significance and of potential practical value in human tissue transplants. The comprehensive review of the methods for separation and purification of antibody should be of great practical value.—[*Immunity and Virus Infection*. By Victor A. Nijjar. 262 pages; illustrated. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 1959. Price \$10.50.]

Handbook of Bacteriology

The first edition of this text, published in 1925, was a condensation of the entire field of bacteriology written primarily for students of medicine. In order to conform to the original objective of a shorter textbook, Stewart has omitted the chapters on pathogenic fungi and protozoa in an attempt to restrict the size of the present edition; the material on the properties of bacteria and viruses is presented only as it is important to the study of human diseases. Naturally there is no mention of the strictly animal pathogens.

As a result of this condensation, the facts and concepts of basic bacteriology and immunology are well presented in an abbreviated form without adequate explanation. These chapters would serve as excellent review material for students who had taken a basic course in bacteriology and were beginning a study of medical bacteriology. If this book were used as a text, however, it would be necessary to supplement the material with extensive lectures or additional reading assignments.

One objection from the American students' viewpoint would be the liberal use of English terms and even trade names. This could confuse the student rather than enlighten him. The text would have limited reference value because of the lack of a bibliography.—[*Bigger's Handbook of Bacteriology*. By F. S. Stewart. 7th Ed. 611 pages. Williams and Wilkins Co., Baltimore, Md. 1959. Price \$8.00.]—B. B. HANCOCK.

THE NEWS

Summary of Actions Taken by Permanent Committee— XVIth International Veterinary Congress

The following summary of meetings of the Permanent Committee for the XVIth International Veterinary Congress held May 22-27, 1959, in Madrid, covers some items which have already been published (*see* the JOURNAL, July 15, pp. 132-133; August 15, pp. 238-239; and September 1, pp. 289-290) but which are covered here as a record of the Permanent Committee sessions in Madrid.

Attendance

A total of 28 countries were represented in the Permanent Committee meetings:

Argentina	Japan
Australia	Netherlands
Austria	New Zealand
Belgium	Norway
Bulgaria	Peru
Canada	Portugal
Czechoslovakia	Spain
Denmark	Sweden
Finland	Switzerland
France	Union of South Africa
Germany	United Kingdom
Hungary	United States of America
Ireland	U.S.S.R.
Italy	Yugoslavia

Members of the Bureau of the Permanent Committee who were present follow: Professor W.I.B. Beveridge, England, president; Professor Dr. K. Wagener, Germany, vice-president; Professor Dr. L. de Blicke, Netherlands, deputy-secretary; and Professor Dr. Jac. Jansen, Netherlands, general-secretary. Professor W. I. B. Beveridge presided at the meetings.

New Proposals

The proposals to change the name of the International Veterinary Congresses to *World Veterinary Congresses*, to call the parent body of these Congresses the *World Veterinary Association*, and the Permanent Committee to be named the *Permanent Committee of the World Veterinary Association*, were accepted.

A draft constitution of the new Association was accepted unanimously and it was agreed that rules based on the new constitution should be drawn up.

Also accepted was the rule that persons from countries whose national veterinary associations or other representative agencies that are not contributing or paying their assessments to the Con-

gress Fund shall pay a Congress fee at least 50 per cent greater than those from contributing countries.

Fifteen Affiliated Sections

Affiliation of International Associations of Veterinary Specialists.—The following headings for specialist associations to be affiliated with the W.V.C. as sections (15) were recommended:

Anatomy
Physiology, Biochemistry, Pharmacology (including animal behavior)
Zootechnics (including nutrition, animal breeding, and production)
Pathology (including chemical pathology)
Infectious Diseases (including microbiology and immunology)
Parasitology (including helminthology, protozoology, and entomology)
Hygiene of Animal Products (veterinary food hygiene)
Clinical Medicine
Tropical Veterinary Medicine
Surgery (including anesthesia and radiology)
Veterinary State Medicine and Veterinary Public Health
Small Animal Specialists
Avian Specialists
Veterinary Education
Professional interests

A proposal was submitted to the Permanent Committee to establish a scientific program advisory committee consisting of the members of the Bureau of the Permanent Committee and one representative from each affiliated specialist association.

Honorary Members Elected.—Professor Dr. R. Manninger, Budapest, Hungary, and Professor J. Verge, Alfort, France, were unanimously elected as Honorary Members of the World Veterinary Association.

New Members of the W.V.A.—Formal applications were received from Iran and Mexico for membership and both were accepted.

Veterinary Film Project.—A catalogue of veterinary films, prepared by the secretariat of the Permanent Committee under the direction of Professor de Blicke, will be distributed to members of the Congress. Additional copies will be available at \$1.50 each and may be ordered from Pro-

fessor L. de Blicck, deputy-secretary, World Veterinary Association, Bilstraat 168, Utrecht, Netherlands.

In addition, the Film Committee of the Permanent Committee which is also the Standing Committee on Veterinary Films of the International Scientific Film Association (I.S.F.A.) was re-elected.

Site and Date of the Next (XVIIIth) Congress.—As the result of a ballot vote on the site of the next Congress, the invitation to meet in Germany (at Hannover), in 1963, was accepted.

Official Observer Status—for OIE, WHO and FAO—It was voted unanimously to extend official observer status to the following international organizations: Office of International Epizootics; World Health Organization; and the Food and Agriculture Organization of the United Nations.

Resolutions Adopted by the XVIIth I.V.C.—Of the various resolutions proposed by the subsections, nine were approved and adopted at the closing plenary session of the Congress (see the JOURNAL, Sept. 1, 1959, pp. 289-290).

Members of Bureau Elected.—At its final session on May 27, the Permanent Committee of the W.V.A. elected the following members:

President—Professor W.I.B. Beveridge, United Kingdom

Vice-President—Professor Dr. K. Wagener, Germany

Vice-President—Dr. W. A. Hagan, United States

Deputy-Secretary—Professor Dr. L. de Blicck, Netherlands

Secretary-Treasurer—Dr. Jac. Jansen, Netherlands

First Annual V.M.A. State Secretaries Conference

The first annual V.M.A. State Secretaries Conference will be held at the Congress Hotel in Chicago, Ill., Nov. 21-22, 1959. Announcement of plans for such a meeting was presented to the House of Delegates at the AVMA's 96th Annual Convention in Kansas City, Mo.

Scheduled as an annual event, the following three sessions are being considered for this first conference: planning a successful meeting; program planning; and the organizational structure of the state association. Panel discussions will be held in each session with time devoted to the opinions of the conferees. Panelists and moderators for the most part will be state secretaries.

The AMVA will host a luncheon and dinner on November 21 and a breakfast and luncheon on November 22.

Captain Stowell Appointed New Scientific Director at A.F.I.P.

Dr. Robert E. Stowell (M. D.) has recently been appointed scientific director of the Armed

Forces Institute of Pathology. He succeeds Ernest W. Goodpasture who resigned in April.

Prior to his joining the A.F.I.P., Dr. Stowell had been professor and chairman of the Department of Pathology and Oncology and director of cancer research at the University of Kansas Medical Center, Kansas City, Kan., for 11 years.

Currently, he is president of the International Academy of Pathology and chairman of the Intersociety Committee for Research Potential in Pathology.

Additional Veterinary Colleges in Italy Approved for Federal Employment

The additional Italian veterinary colleges whose educational qualifications were approved for federal employment are located at: the University of Turin; the University of Milan; the University of Bologna; the University of Perugia; and the University of Sassari [see the JOURNAL, May 15, 1959, p. 483, for Dr. C. K. Mingle's comments on veterinary education in Italy].

The two Italian colleges at Pisa and Naples have been on the approved list for a number of years and are being retained.—*The Federal Veterinarian*, 16, (May, 1959): 8.

AMONG THE STATES AND PROVINCES

California

Sacramento Valley Association.—Officers of the Sacramento Valley V.M.A. for 1959-1960 are: Drs. Ronald Hauge, Sacramento, president; Leland Bell, Carmichael, vice-president; Eugene Story, Sacramento, secretary; and Leonard Griffin, Sacramento, program chairman.

Meetings are held the second Thursday of each month with the location specified monthly.

S/LELAND J. BELL, Vice-President.

Colorado

Colorado State's Veterinary College to Participate in \$2,500 Heart Grant.—Colorado State University's College of Veterinary Medicine, Department of Physiology, and the University of Colorado's Medical School are presently engaged jointly in research on congestive heart failure.

The \$2,500 grant to support this work was given by the Colorado Heart Association and the Fort Collins United Fund. Heart research by the two universities has been in progress for several years, supported by the National Heart Institute and the Colorado Heart Association.—*Rocky Mountain Veterinarian*, 7, (June, 1959): 20.

Maryland

Dr. A. H. Frank New Research Leader in Bacteriological Investigations Group.—Dr. Archie H. Frank (MSU '34) has recently been appointed research leader in the bacteriological investigation group of the National Animal Disease Laboratory, Animal Disease and Para-



Dr. Archie H. Frank



Dr. Ralph C. Fish

site Research Division, ARS, U. S. D. A., in Beltsville, Md. His research activities will be transferred to the new Animal Disease Laboratory at Ames, Iowa, upon its completion (scheduled for sometime in November, 1960).

Dr. Frank has been with the Department of Agriculture since 1934 and is known throughout the world as an authority on the reproductive diseases of domestic animals.

New Mexico

New Association Formed—The Tularosa Basin V.M.A.—A recent meeting of the local veterinarians from Alamogordo and Hollaman Air Force Base resulted in the formation of a new association, the Tularosa Basin Veterinary Medical Association.

Officers of the newly formed organization are: Major J. D. Mosley, president; Lieutenant G. Edwards, vice-president; and Dr. Earl R. Leslie, 903 10th St., Alamogordo, secretary.

The Association will meet the first Friday of each month. All veterinarians in the southern part of the state are invited to attend.

s/EARL R. LESLIE, *Secretary*.

New York

Dr. Ralph C. Fish Now Agent Safety Officer at Plum Island.—Dr. Ralph C. Fish (UP '39) has been appointed agent safety officer of the Animal Disease and Parasite Research Division, ARS, U. S. D. A., at the Plum Island Disease Laboratory.

He represents the director of the laboratory in matters pertaining to safety procedures in

the laboratory and to the physical security of the personnel.

Dr. Fish recently returned to the United States from Amsterdam, Holland, where he represented the Animal Disease and Parasite Research Division for two years, as chief of the European Mission for foot-and-mouth disease research.

North Carolina

Twin Carolinas Association.—The 1959 officers of the Twin Carolinas V.M.A. are: Drs. C. C. McLean, Southern Pines, president; G. L. Lawhon, Jr., Hartsville, vice-president; and J. E. Currie, Jr., Southern Pines, secretary.

Ohio

Dr. J. B. Sims Is New Director of Holstein-Friesian Association.—Dr. Jacob B. Sims (OSU '41), Lancaster, Ohio, was recently elected director of the Holstein-Friesian Association of America.

A breeder of registered Holstein-Friesians since 1948, Dr. Sims is active in the management of four herds totaling 250 head. Two of these herds he operates in conjunction with his father, Dr. Otto L. Sims (OSU '11).

Dr. Jacob Sims served with the U.S. Army Veterinary Corps throughout World War II, beginning his practice in Lancaster in 1946. He is a past president of his county Holstein-Friesian group. At present, he is in his second term as vice-president of the Ohio Holstein-Friesian Association and a member of the Health Committee of the Ohio Dairymen's Association.

Geauga County V.M.S. Newly Formed.—The chief purposes of the new Geauga County Veterinary Medical Society are to further the cause of veterinary medicine in the area, to promote a better understanding among fellow practitioners, and to aid the County Health Department in its work.

One of the first acts of the new Society was the formation of the following rabies program: stray dog pickup; animal bite reporting; wild-life control; a public education program; and a compulsory vaccination with chicken embryo vaccine, which is recognized for three years.

Dr. Allan P. Cragg of Chardon is president and Peter J. Clemens, Jr., of Chagrin Falls is secretary-treasurer.

Virginia

State Association Meeting.—The summer meeting of the Virginia V.M.A. was held at the Chamberlin Hotel, Old Point Comfort, Fort



Dr. J. M. Hejl

officer of veterinary biologics licensing to become assistant director of the Animal Inspection and Quarantine Division.

Dr. Hejl had served in the former capacity for nine years. Prior to this, he had been a virus-serum inspector at the Division's field station in Omaha. Before his entry into federal service in 1946, Dr. Hejl was with the Union Stock Yards in Omaha, Neb., for three years. In 1958, he received an M.S. degree in microbiology from the University of Maryland.

s/L. C. HEEMSTRA, *Director.*

Dr. G. V. Peacock Appointed Chief Staff Officer for Veterinary Biologics Licensing.—Within the Animal Inspection and Quarantine



Left to right—Drs. J. D. Wittig, program chairman; Samuel F. Scheidy, currently president of the AVMA; Seymour Glasofer, local arrangements chairman.

Monroe, Va., July 19-21, 1959. Approximately 160 members and guests were in attendance.

The scientific portion of the program included the following out-of-state speakers: Dr. T. F. Benson, Ithaca, N.Y.; Captain N. P. Clarke, U.S.A.F., Wright Patterson Field, Ohio; Dr. Myron G. Fincher, Ithaca, N.Y.; Dr. R. L. Rudy, Columbus, Ohio; and Dr. Sam F. Scheidy, Bryn Mawr, Pa.

s/G. B. ESTES, *Secretary.*

Washington, D. C.

Dr. J. M. Hejl Becomes Assistant Director of the A.I.Q. Division.—Dr. J. M. Hejl (TEX '43) recently vacated the position of chief staff



Dr. G. V. Peacock

Division, ARS, U.S.D.A., Dr. G. V. Peacock (ISU '50) was transferred to Washington, D.C., from Omaha, Neb. He has been appointed acting chief staff officer for veterinary biologics licensing, succeeding Dr. J. M. Hejl (see p. 446).

Holding various assignments with the Division since 1950, Dr. Peacock had served as an inspector in charge of veterinary biologics licensing and inspection in Berkeley, Calif., and in Omaha, Neb., each for a period of two years, prior to his transfer to Washington.

Dr. Peacock is a native of Osceola, Iowa.
S/L. C. HEEMSTRA, *Director.*

FOREIGN NEWS

Switzerland

Papers Invited for the Second Symposium of the I.A.V.F.H.—The Second Symposium of the International Association of Veterinary Food Hygienists will be held in Basel, Switzerland, May 15-21, 1960. The program will include:

1) Minimum requirements for antemortem and postmortem inspection with special reference to international acceptance.

2) a. Experiences with preservation of foods of animal origin by use of ionizing radiation.

b. Disposition of meat from animals exposed to ionizing radiation or that may contain radioactive material.

3) Bacteriological examination and disposition of canned meat and fish products (both sterile and perishable-type products are considered).

4) Prepackaging of meat, poultry, and fish products.

5) The reason for existence of "public" slaughterhouses.

6) Epidemiology of salmonellosis in animals and man.

7) a. Milk sterilization through ultra high temperature flash heating.

b. Milk hygiene in tropical and subtropical countries.

Beside the above subjects, short papers may also be read in connection with them or in any other field of veterinary food hygiene. These short communications should have a maximum length of 600 words and must be written in one of the official languages (English, French, or German). All lectures and discussions will be translated simultaneously into these three languages.

Announcement deadline for these papers is Dec. 15, 1959. Invitations, preliminary programs, application forms, and additional information may be obtained from Dr. C. H. Pals, I.A.V.F.H. vice-president, ARS, U.S.D.A., Washington, 25, D.C.

S/C. H. PALS, *Correspondent.*

DEATHS

Star indicates member of AVMA

★**Albin S. Einoris** (CVC '20), 64, former small animal practitioner of South Bend, Ind., for 25 years and of West Palm Beach, Fla., for the past five years, died on Aug. 24, 1959. Death was attributed to a coronary occlusion which occurred while he was attending the AVMA Convention in Kansas City.

Born in Lithuania in 1894, Dr. Einoris came to this country when he was 17 years old. Following graduation from Chicago Veterinary College with the last class from that institution, he established a small animal practice in South Bend and was located there until 1954 when he moved to Florida. He had been a member of the AVMA since 1936 and was also a member of several fraternal and civic organizations.

He is survived by his widow, the former Sally Metekonis, whom he married in 1918.

★**William F. Irwin** (KSC '33), 48, prominent small animal practitioner of Tulsa, Okla., and a member of the AVMA Executive Board, died on Sept. 10, 1959, as the result of injuries received in an airplane accident while on a hunting trip near Fairbanks, Alaska. He was struck by the wing and propeller of the plane as it prepared to take off from the campsite.



Dr. William F. Irwin

Born Aug. 15, 1911, at Wilsey, Kan., Dr. Irwin worked with two Oklahoma veterinarians for a time following graduation, and then served with the Bureau of Animal Industry for a year, before establishing a small animal practice and hospital in Tulsa with his wife, Dr. Helen B. Irwin, also a graduate of the School of Veterinary Medicine at Kansas State, class of 1932.

Dr. Irwin was a past president (1955-1956)

of the American Animal Hospital Association, a member of its standing committee on membership and inspection and of its special committees on employee training and constitution and bylaws.

He was admitted to AVMA membership in 1937 and had contributed to a number of its programs and clinics. In addition, Dr. Irwin was co-chairman of the Section on Small Animals for the joint Pan American—AVMA meeting in Kansas City, Mo., this year.

In December, 1958, he was elected to represent District VII (Kansas, Missouri, and Oklahoma) for a six-year term on the AVMA Executive Board. Dr. Irwin was also a past president of the Oklahoma V.M.A. He was prominent in alumni activities of his Alma Mater and was recently elected member-at-large of its veterinary alumni association. A frequent lecturer and author of many articles in his field, Dr. Irwin was also active in civic affairs, particularly in youth work.

Surviving are his widow, the former Helen Richt, whom he married in 1934; three sons; his father; three brothers; and three sisters.

Elmer J. Johnston (KCV '12), 72, Excelsior Springs, Mo., died July 1, 1959, after an illness of three years.

Born in Beverly, Kan., Dr. Johnston moved to Excelsior Springs in 1903, shortly after his graduation. He continued to practice there until his retirement three years ago.

He served in the Army Veterinary Corps in World War I and remained in the reserves, retiring in 1947 as a lieutenant colonel.

Eilert H. Kartrude (KCV '08), 76, Kansas City, Mo., died June 25, 1959.

Dr. Kartrude was born in Minnesota and spent most of his professional career in Austin, Minn., retiring in 1950. He moved to Kansas City three years ago.

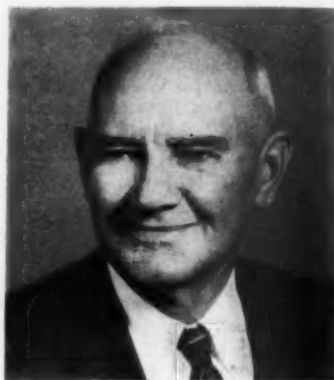
★Urd E. Marney (KCV '12), 76, well known and widely-traveled small animal practitioner of San Antonio, Texas, and prominent in professional association work in that state for many years, died on Aug. 24, 1959, while attending the AVMA Convention in Kansas City. Death was due to circulatory failure following an operation for a perforated ulcer, complicated by peritonitis.

Born in Neosho, Mo., on Nov. 1, 1882, Dr. Marney graduated from the local high school before enrolling at Kansas City Veterinary College from which he received his D.V.M. degree in 1912.

He had practiced in San Antonio since 1923 until retiring several years ago. He had a

special interest in cancer research and had collaborated with medical colleagues of the Pan American Cancer Foundation for some time before giving up active work.

In his professional associations, Dr. Marney had served as president of the Bexar County



Dr. Urd E. Marney

V.M.A. which honored him, in 1958, with a bronze plaque in recognition of his outstanding services to the association and its auxiliary. He had been similarly honored by the Texas V.M.A. of which he was president in 1927 and subsequently a life member.

He joined the AVMA in 1926 and was made a life member in 1957. Dr. Marney also served as vice-general chairman of the committee on local arrangements for the 1956 AVMA Convention in San Antonio.

He is survived by his widow, the former Gussie Weaver, whom he married in 1923.

George A. Rostetter (MCK '16), 73, Hesston, Kan., died July 7, 1959.

Dr. Rostetter was born in DeWitt, Ill., in 1886. He had lived and practiced in Hesston for 46 years.

Willie H. Stanley, 79, White Plains, Ky., died June 20, 1959, following a stroke.

Dr. Stanley had lived his entire life in Hopkins County. At one time, he served two four-years terms on the Board of Education there.

Howard R. Wise (UP '14), 70, Birdsboro, Pa., died June 28, 1959.

Born in Amityville, Dr. Wise had practiced in the Birdsboro and Geigertown area for 30 years. He was a meat inspector in Reading for four years and, for the past three years, held a similar position at a Shillington abattoir.

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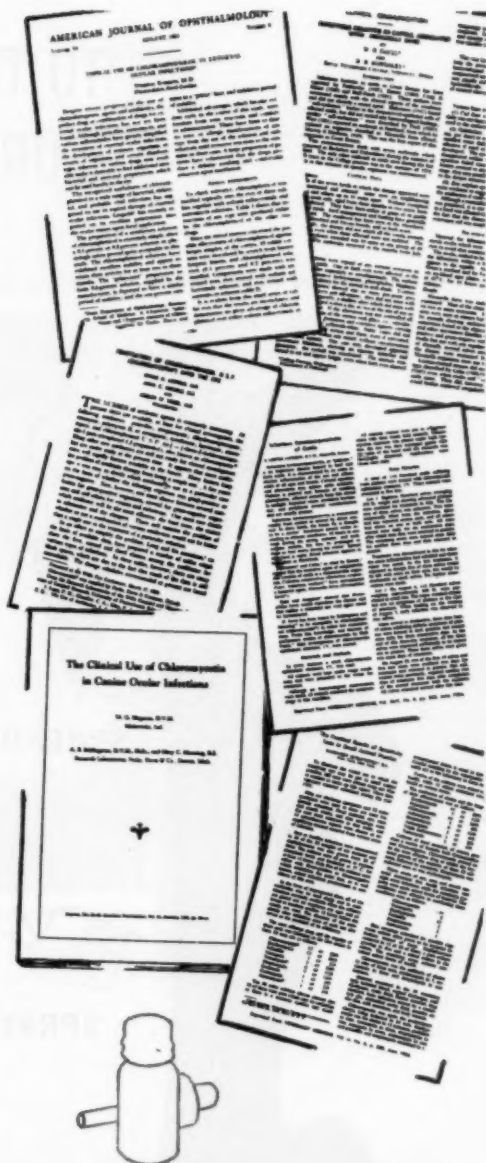
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INFECTIOUS KERATITIS IN CATTLE, ASSOCIATED WITH MORAXELLA BOVIS
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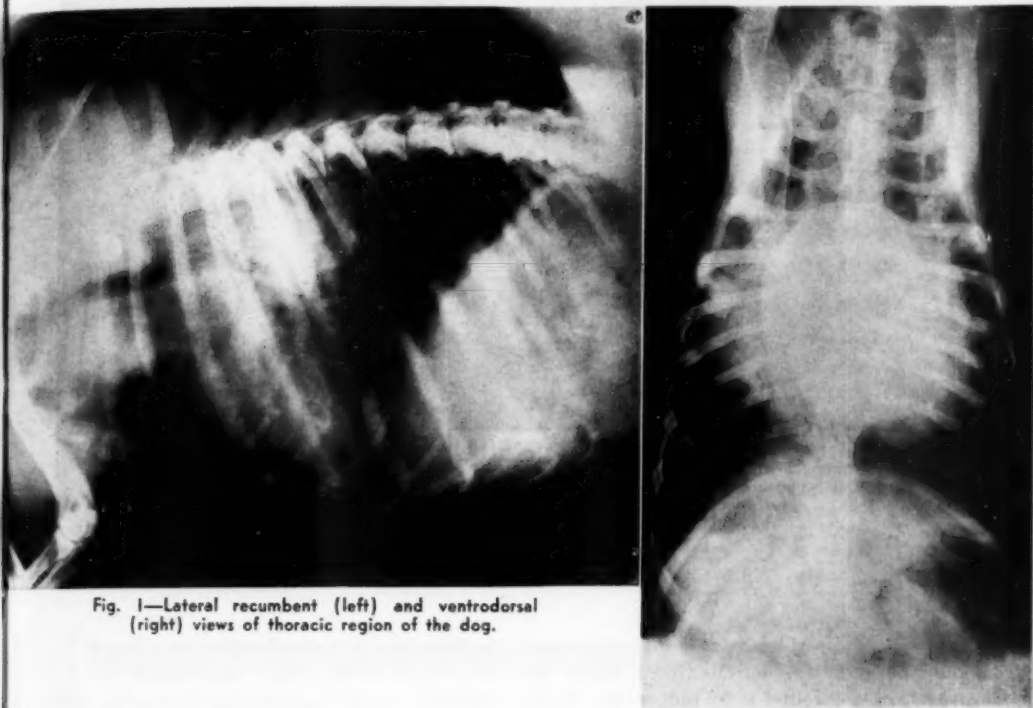


Fig. 1—Lateral recumbent (left) and ventrodorsal (right) views of thoracic region of the dog.

History.—A male Beagle, 11½ years old, had a persistent cough for several months. The frequency of the cough increased but the dog's physical condition was good for his age. Lateral and ventrodorsal radiographs were taken of the thorax (fig. 1-2).

Here Is the Diagnosis

(Continued from preceding page)

Diagnosis.—An area of increased radiopacity of the thorax in the region of the cardiac lobes of the lungs, especially on the right side, and dorsal to the base of the heart.

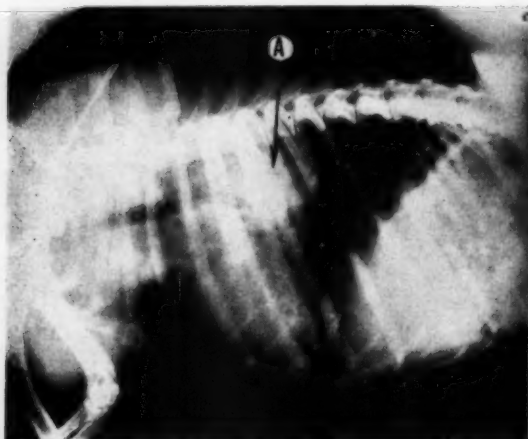
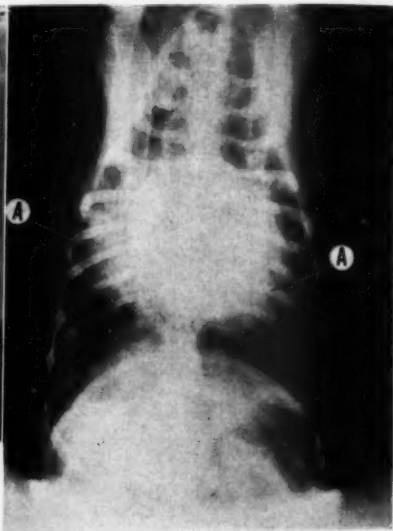


Fig. 2—Lateral recumbent (left) and ventrodorsal (right) views of the Beagle showing tumor mass (A) in the lungs and lymph nodes near the bifurcation of the bronchi.



Comment.—A thoracotomy was performed and the dog was euthanatized when the condition was found to be inoperable. Widespread tumor masses were found in all lobes of the lungs and in the mediastinal lymph nodes with the largest lesion at the bifurcation of the bronchi. Histologically the tumor appeared to be an adenocarcinoma, probably originating in the area of the right bronchus of the cardiac lobe. There was widespread extension and metastases with no evidence of tumor found elsewhere.

This report was submitted by Chester W. Paulus, D.V.M., New Brunswick, N. J.; opinion, from pathological material, was given by John McCoy, D.V.M., Bureau of Biological Research, Rutgers University, New Brunswick, N. J.

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Kenneth Whittington, 769 Vance Ave., Memphis, Tenn. (1964).

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Women's Auxiliary



Above, right—Nelson Art Gallery, the setting for the Auxiliary Tea and Reception. Seated at the head table, Auxiliary luncheon, were (left to right): Back row—Mesdames Lewis Moe, J. D. Stevens, B. S. Pomeroy, S. F. Scheidy, E. E. Leasure, Dan Anderson, E. A. Woelffer, J. I. Cornwell, A. W. Eivers, F. R. Booth, and E. H. Gloss. Front row—Mesdames G. L. Johnson, R. E. Rebrassier, Glen Dunlap, J. G. Hardenbergh, K. M. Curts, Senora Cecilia de Uribe, Mesdames H. E. Kingman, and C. M. Rodgers.

Convention Activities

New Constitution Adopted

■ The adoption of a new Constitution, closely paralleling the Constitution of the AVMA, and the election of new officers highlighted the business sessions of the annual meeting of the Women's Auxiliary to the AVMA in Kansas City, August 25, 1959. The meetings were held in the Muehlebach Hotel, where the Auxiliary was organized in 1917.

Under the new Constitution, each state or provincial auxiliary will be allowed one delegate to the House of Representatives for each fifty na-

tional members, or fraction thereof, whose dues are paid through the current year. Each state or province will be allowed a delegation composed of at least one delegate, and not more than seven.

Five vice-presidents, instead of three, will serve on the Executive Board. Vice-president for publications and vice-president for public relations media are the two new offices created by the new Constitution. Formerly, chairmen of these two committees were appointed by the president.

Following is the roster of officers and appointments for the coming year.

The AVMA Women's Auxiliary House of Delegates in session.



Officers of the Women's Auxiliary, 1959-1960

President—Mrs. Frank R. Booth, 3920 E. Jackson Blvd., Elkhart, Ind.

President-Elect—Mrs. E. E. Leasure, 318 South 17th St., Manhattan, Kan.

Vice-President for the House of Representatives—Mrs. J. I. Cornwell, P. O. Box 9263, Asheville, N. Car.

Vice-President for Publications—Mrs. A. M. Simpson, 1600 Indian Hills Dr., Big Springs, Texas.

Vice-President for Public Relations Media—Mrs. Don W. Clarke, P. O. Box 150, Friday Harbor, Wash.

Vice-President for Student Auxiliaries and Student Awards—Mrs. C. M. Rodgers, P.O. Drawer G, Blandinsville, Ill.

Vice-President for Student Loans—Mrs. Austin W. Eivers, 1354 Morningside S. E., Salem, Ore.

Secretary—Mrs. D. A. Osguthorpe, 4686 Highland Dr., Salt Lake City 17, Utah.

Treasurer—Mrs. Peter Roy, 4443 Atlantic Blvd., Jacksonville 7, Fla.

Membership Secretary—Mrs. E. H. Gloss, Gaylord, Minn.

Retiring President—Mrs. E. A. Woelffer, 115 Woodland Lane, Oconomowoc, Wis.

Appointments, 1959-1960

Parliamentarian

Mrs. John D. Stevens, P.O. Box 576, Sequim, Wash.

Historian

Mrs. Alton Moyle, Jr., 121 Walnut St., Delavan, Wis.

Nominating Committee

Mrs. William L. Beer, *Chairman*, 612 N. College Ave., Aledo, Ill.

Mrs. W. W. Armistead, 537 Kedzie Ave., East Lansing, Mich.

Mrs. Alvin W. Rice, 2817 Avenham Ave., Roanoke, Va.

Membership Advisory Committee

Mrs. Mark Davenport, Jr., 215 S. Edgewood Ave., La Grange, Ill.

Mrs. E. R. Derflinger, 2145 State St., Salem, Ore.

Mrs. E. N. Anderson, 112 Archibald St., St. Boniface, Manitoba, Canada.

Mrs. J. Franklin Witter, 3 Riverdale, Orono, Maine.

Mrs. D. L. Cotton, 110 Cedar, Beresford, S. Dak.

Mrs. Paul Spencer, 206 Hub St., Jefferson City, Mo.

Public Relations Media Committee

Mrs. Gilbert Meyer, 4145 Balfour, Detroit 24, Mich.

Mrs. Richard G. Pearce, 820 Suffield Rd., Birmingham, Mich.

Mrs. E. L. Symington, 84 West Park Pl., Newark, Del.

Mrs. H. K. Fuller, South Main St., Interlaken, N. Y.

Social Activities

Families of veterinarians attending the annual AVMA meeting in Kansas City, Mo., were busy attending the many social activities planned for them.

On Monday afternoon, the women toured the Truman Library, Old Jackson County Jail and Museum, and the Reorganized Church of Latter Day Saints Auditorium. Harry S. Truman, former president of the United States, was present at the library to greet the women.

Amid the marble columns of the Nelson Art Gallery, a tea and reception was held on Tuesday afternoon. Guided tours of the Gallery were conducted for those who wished to see the art exhibits.

Luncheon on Wednesday was served to 600 women in the Municipal Auditorium. Colors of blue and gold were used in the table decorations and the menus, which were printed in Spanish in honor of the Pan American guests. ■

The new Executive Board of the Women's Auxiliary. Seated (left to right): Mesdames P. S. Roy, J. I. Cornwell, D. A. Osguthorpe, F. R. Booth, J. D. Stevens, E. H. Gloss, and A. E. Eivers.

Standing: Mesdames A. D. Simpson, C. M. Rodgers, D. W. Clarke, E. E. Leasure, and E. A. Woelffer.



History of the AVMA

The year 1870 appears to have been one of little activity so far as Association matters were concerned. A quorum was not obtained at the semiannual meeting in Philadelphia, and no papers were presented at the

1870

New York College of Veterinary Surgeons. The officers of the previous year were re-elected, thus apparently establishing a precedent on the basis of what was perhaps an expedience. No strong sentiment existed against a man serving two or more terms as president of the Association until about 1900, when the feeling prevailed that the highest office should not be monopolized. By this time, of course, the membership of the Association was more truly representative of the veterinary profession.

There had been earlier rumblings of discontent over the apparent fact that the Association was dominated by the New York-Massachusetts group, and in a gesture to break the established pattern of meeting alternately in Boston and New York, the semiannual meeting for 1870 was scheduled for Philadelphia. The fact that a quorum was not obtained apparently prejudiced sentiment in favor of custom, and for a number of years the old pattern was maintained. The first major break came when the annual meeting for 1884 was held in Cincinnati.

While it might be argued that the Association might have become more representative of the veterinary profession had it moved around, it is perhaps more than likely that it would not have achieved sufficient support to sustain it, for relatively few veterinarians within its sphere of influence supported the U.S.V.M.A. With only the meetings to serve as a cohesive force, it is more than a little fortunate that the Association functioned as well as it did.

The Black Horse Inn, popular meeting spot in Philadelphia in the 1870's.



ELISHA F. THAYER, M.D., V.S., sixth president of the U.S.V.M.A., was born at Dedham, Mass., in December, 1815. His father was a physician, but it was some time before he followed in his father's footsteps. In 1869, the University of Vermont conferred upon him the M.D. degree, but it is not apparent whether this was an earned or an honorary title.

Little is known of his early life, but about 1850 he began to ride and study with Dr. Charles M. Wood. He was engaged in veterinary practice for some time prior to the year 1853, when he went abroad to study at London and at Glasgow. Here he became a special student of the celebrated John Gamgee. Upon his return he again entered practice, but ill health forced him to give this up for some time. It was undoubtedly his tutelage under Gamgee that so admirably fitted him for his later work with the Massachusetts Cattle Commission.

In 1859, along with George Dadd, he was sent by the state of Massachusetts to investigate a new disease in an imported herd of Dutch cattle. Thayer diagnosed the disease as contagious pleuropneumonia, and although his views were in conflict with many physicians, prominent agriculturalists, and veterinarians, he was made a member of the Cattle Commission in 1862, and later became its head.

Adopting Thayer's recommendations, the commission was successful in stamping out the disease in 1865 at a cost of only \$68,000. As a result of his continuing program—Thayer was a member of the commission for nearly 25 years—the disease did not reappear in Massachusetts, despite that fact that neighboring states were infected.

Dr. Thayer was characterized as "one who ever had an eye single for the advancement of the profession which he loved, and for the health and welfare of the animal. He was a student, ever at work either in his library, the dissecting table or on the subject, working long into the night . . . Free from any desire for position himself, it was only when fairly thrust upon him that he would accept such places . . . His life is an example for the younger members of the profession to follow." He was one of the best informed men in the profession of his time, and undoubtedly was the ablest in veterinary sanitary police matters, as his record attests.

In 1879 he suffered an apoplectic stroke from which he never fully recovered, yet he continued to work with both the state and national cattle commissions, and engaged to some extent in private practice until his death on July 29, 1889, at the age of 73.

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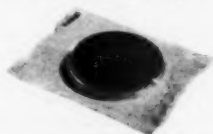
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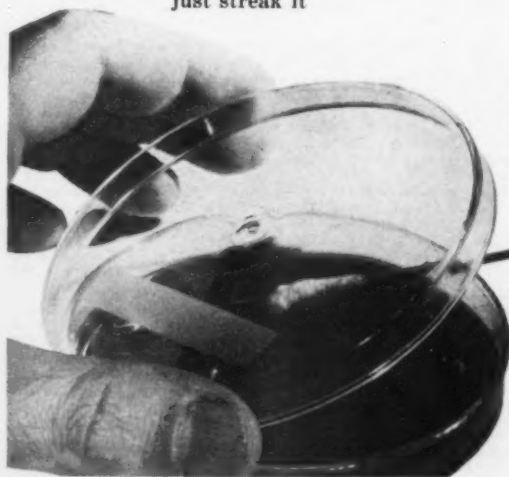
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COMING MEETINGS

Notices of coming meetings must be received 30 days before date of publication.

Texas Veterinary Medical Association. Annual meeting. Hotel Windsor, Abilene, Oct. 18-20, 1959. Dr. Paul B. Blunt, 710 Maverick Building, San Antonio 5, Texas, executive secretary.

American Public Health Association. Annual meeting. Atlantic City, N.J., Oct. 19-23, 1959. Ernest S. Tierkel, Communicable Disease Center, 50 Seventh St., N.E., Atlanta 23, Ga., correspondent.

Interstate Veterinary Medical Association. Annual meeting. Sioux City, Iowa, Oct. 22-23, 1959. Dr. Don Rubel, 3209 38th St., Sioux City, secretary.

Iowa State College. Eleventh annual veterinary homecoming luncheon. Iowa State College, veterinary courtyard, Ames, at 11:00 a.m., Oct. 24, 1959. Roger Schlatzky, correspondent.

Animal Care Panel. Annual Convention. Sheraton Park Hotel, Washington, D.C., Oct. 29-31, 1959. William I. Gay, Animal Care Panel, 2101 Constitution Ave., Washington 25, D.C., publicity committee chairman.

Southern and West Virginia Veterinary Medical Associations. Combined meeting. Lord Baltimore Hotel, Baltimore, Md., Nov. 1-4, 1959. A. A. Husman, P. O. Box 91, Raleigh, N. Car., secretary, Southern V.M.A., and H. J. Fallon, 200 5th St., W. Huntington, W. Va., secretary, West Virginia V.M.A.

Missouri, University of. Thirty-fifth annual veterinary conference. University of Missouri, School of Veterinary Medicine, Columbia, Nov. 2-3, 1959. Cecil Elder, chairman.

Mississippi Valley Veterinary Medical Association. Annual meeting. Hotel Père Marquette, Peoria, Ill., Nov. 4-5, 1959. W. Paul Hendren, 417 N. Adams St., Carthage, Ill., secretary-treasurer.

New England Veterinary Medical Association, the Massachusetts Veterinary Association, and Region I of the American Animal Hospital Association. Combined meeting. Stadler Hilton Hotel, Boston, Mass., Nov. 7-11, 1959. Dr. Frederick G. Ruder, Jr., 300 N. Pleasant St., Amherst, Mass., president, New England V.M.A. and Massachusetts V.A.

Midwest Small Animal Association and the American Animal Hospital Association. Regional meeting. Hotel Burlington, Burlington, Iowa, Nov. 11-12, 1959. J. Porter Coble, 2828 S. MacArthur Blvd., Springfield, Ill., secretary-treasurer.

National Swine Industry Conference. Second annual meeting. Iowa State University, Ames, Nov. 19-20, 1959. J. Russell Ives, American Meat Institute, 59 East Van Buren St., Chicago 5, Ill., conference secretary.

Midwest Feed Manufacturers' Association. Second conference. Kansas City, Mo., Nov. 30-Dec. 1, 1959.

Veterinary-Nutrition Conference. Second annual meeting. President Hotel, Kansas City, Mo., Nov. 30-Dec. 1, 1959. This conference is sponsored jointly by the Iowa, Kansas, Missouri, and Nebraska Veterinary Medical Associations and the Midwest Feed Manufacturers' Association.

Nebraska Veterinary Medical Association. Winter meeting. Cornhusker Hotel, Lincoln, Neb., Dec. 1-3, 1959. Dr. H. E. Hedlund, 403 N. Broadway, Wahoo, program chairman.

National Association of Federal Veterinarians. Forty-second annual meeting. Sheraton-Palace Hotel, San Francisco, Calif., Dec. 14, 1959, at 7:30 p.m. L. T. Hopkins, 5837 Highland Ave., Kansas City 4, Mo., secretary-treasurer.

United States Livestock Sanitary Association. Sixty-third annual meeting. Sheraton-Palace Hotel, San Francisco, Calif., Dec. 15-18, 1959. R. A. Hendershott, 33 Oak Lane, Trenton, N.J., secretary.

Kansas Veterinary Medical Association. Fifty-sixth annual convention. Hotel Broadview, Wichita, Jan. 10-12, 1960. Melvin W. Osburn, 1525 Humboldt, Manhattan, Kan., secretary.

Intermountain Veterinary Medical Association. Annual meeting. Hotel Utah, Salt Lake City, Jan. 20-22, 1960. For information contact: Dr. Douglas H. McKelvie, 1220 South State St., Salt Lake City, Utah, or Dr. R. A. Bagley, 4600 Creek View Dr., Murray, Utah.

Minnesota State Veterinary Medical Society. Annual meeting. Hotel St. Paul, St. Paul, Minn., Jan. 25-27, 1960. B. S. Pomeroy, University of Minnesota, College of Veterinary Medicine, St. Paul 1, Minn., secretary.

Ohio State Veterinary Medical Association. Annual meeting. Deshler-Hilton Hotel, Columbus, Jan. 31-Feb. 3, 1960. R. E. Rebrassier, 1411 West Third Ave., Columbus 12, Ohio, executive secretary.

Oklahoma Veterinary Medical Association. Forty-fifth annual meeting. Biltmore Hotel, Oklahoma City, Feb. 1-2, 1960. W. F. Irwin, 3550 South Peoria Ave., Tulsa, Okla., secretary.

Foreign Meetings

International Association of Veterinary Food Hygienists. Second Symposium. Basel, Switzerland, May 15-21, 1960. Dr. A. Clarenburg, 1, Sterrenbos, Utrecht, The Netherlands, president.

Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Medical Association, the first Thursday of each month. James L. Chambers, 4307 Normanbridge Rd., Montgomery, Ala., secretary-treasurer.

Jefferson County Veterinary Medical Association, the second Thursday of each month. Dan P. Griswold, Jr., 714 S. 39th St., Birmingham, secretary.

Mobile-Baldwin Veterinary Medical Association, the third Tuesday of each month. Cecil S. Yarbrough, 4121 U.S. 90 West, Mobile, Ala., secretary.

Northeast Alabama Veterinary Medical Association, the second Tuesday of every other month. Leonard J. Hill, P.O. Box 761, Gadsden, Ala., secretary-treasurer.

ALASKA—Anchorage Group of the Alaska V. M. A. the last Wednesday of each month at Fort Richardson Officers' Club or Thompson's Restaurant 6th and I Streets, Anchorage, Alas. Lt. Colonel E. H. Akins, Surgeon's Office, U.S.A.R.A.L., Fort Richardson, Alas., secretary to the Alaska V. M. A.

ARIZONA—Central Arizona Veterinary Medical Association
(Continued on adv. p. 47)

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tion, the second Tuesday of each month. J. W. Langley, Jr., P.O. Box 5013, Phoenix, Ariz., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. Gwyn Chapin, 2215 E. Calle Vista, Tucson, Ariz., secretary.

ARKANSAS—Pulaski County Veterinary Medical Society, the second Tuesday of each month. Harvie R. Ellis, 54 Belmont Drive, Little Rock, Ark., secretary-treasurer.

CALIFORNIA—Alameda-Contra Costa Veterinary Medical Association, the fourth Wednesday of Jan., March, May, June, Aug., Oct., and Nov. John S. Blackard, 420 Appian Way, Richmond, Calif., secretary.

Bay Counties Veterinary Medical Association, the second Tuesday of February, April, July, September, and December. Herb Warren, 3004 16th St., San Francisco, Calif., executive secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. Paul S. Chaffee, 2333 McKinley Ave., Fresno, Calif., secretary.

Humboldt-Del Norte Counties Veterinary Medical Association, the second Tuesday of January, May, September, and November. Dr. M. Lunstra, P. O. Box 734, Eureka, Calif., secretary-treasurer.

Kern County Veterinary Medical Association, the first Thursday evening of the month. James L. Frederickson, 17 Nile St., Bakersfield, Calif., secretary-treasurer.

Mid-Coast Veterinary Medical Association, the first Thursday of each month. William P. Matulich, P. O. Box 121, San Luis Obispo, Calif., secretary-treasurer.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. V. Todorovic, 47 Mann Ave., Watsonville, Calif., secretary.

Northern California Association of Veterinarians, the second Tuesday of the month. Andrew F. Giambroni, P. O. Box 782, Red Bluff, Calif., secretary.

North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Covell, in Modesto, Calif. T. J. Carleton, 325 W. Lockeford St., Lodi, Calif., secretary-treasurer.

Orange Belt Veterinary Medical Association, the second Monday of each month. R. Y. Foos, P.O. Box 955, Victorville, Calif., secretary-treasurer.

Orange County Veterinary Medical Association, the third Thursday of each month. H. M. Stanton, 1122 S.E. U.S. Highway 101, Tustin, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of the month. R. M. Grandfield, 416 Stephens Rd., San Mateo, Calif., secretary-treasurer.

Redwood Empire Veterinary Medical Association, the third Thursday of the month. R. R. Rediske, 833 Vallejo Ave., Novato, Calif., secretary-treasurer.

Sacramento Valley Veterinary Medical Association, the second Thursday of each month with the location specified monthly. Eugene C. Story, 4819 "V" St., Sacramento 17, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of the month. Robert F. Burns, 7572 North Ave., Lemon Grove, Calif., secretary-treasurer.

San Fernando Valley Chapter SCVMA, the second Tuesday of each month at 7:30 p.m., Hody's Restaurant, North Hollywood, Calif. Barbara G. Shirley, Canoga Park, Calif., secretary-treasurer.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at the Casa Escobar Restau-

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rant in Studio City. John Chudacoff, 7912 Sepulveda Blvd., Van Nuys, Calif., secretary.

Santa Barbara-Ventura Counties Veterinary Medical Association, every three months, no set date. Gerald M. Clark, 5415 8th St., Carpinteria, Calif., secretary-treasurer.

Santa Clara Valley Veterinary Medical Association, the last Tuesday of the month. Robert L. King, 1269 Grant St., Santa Clara, Calif., secretary-treasurer.

Southern California Veterinary Medical Association, the third Wednesday of the month. Mr. Don Mahan, 1919 Wilshire Blvd., Los Angeles 57, Calif., executive secretary.

COLORADO—Denver Area Veterinary Medical Society, the fourth Tuesday of every month. Gene M. Bierhaus, 2896 S. Federal Blvd., Englewood, Colo., secretary-treasurer.

Northern Colorado Veterinary Medical Society, the first Wednesday of each month, in Fort Collins. E. J. Carroll, Dept. of Clinics and Surgery, Colorado State University, Fort Collins, Colo., secretary.

DELAWARE—New Castle County Veterinary Medical Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington. Del. A. P. Mayer, Jr., R.F.D. 2, Newark, Del., secretary-treasurer.

DISTRICT OF COLUMBIA—District of Columbia Veterinary Medical Association, the second Tuesday evenings of January, March, May, and October. R. B. Gochenour, 10109 Ashwood Dr., Kensington, Md., secretary-treasurer.

FLORIDA—Big Bend Veterinary Medical Association, meets the first Sunday of each month at 5:00 p.m. at the

Tallahassee Dining Room, Tallahassee. C. Paul Vickers, P.O. Box 309, Tallahassee, secretary.

Central Florida Veterinary Medical Association, the first Friday of each month at 8:00 p.m., place specified monthly. L. R. Poe, 753 W. Fairbanks Ave., Winter Park, Fla., secretary-treasurer.

Florida West Coast Veterinary Medical Association, the second Wednesday of each month at the Lighthouse Inn, St. Petersburg, Fred Jones, 3606 S. Dale Mabry, Tampa, Fla., secretary.

Hillsborough County Veterinary Medical Society, the second Monday evening of each month. For additional information as to the location of each meeting, contact: J. J. Metz, Jr., 5207 Nebraska Ave., Tampa 3, Fla., secretary.

Jacksonville Veterinary Medical Association, the first Thursday of every month. Dodson's Restaurant, Stephen C. Hite, 5807 105th St., Jacksonville 10, Fla., secretary.

Northwest Florida Veterinary Medical Society, third Wednesday of each month, time and place specified monthly. John Webb, P.O. Box 183, Cantonment, Fla., secretary-treasurer.

Palm Beach Veterinary Society, the last Thursday evening of each month. McArthur Dairy Building, Four Points, W. Palm Beach. B. W. Bigger, 2833 S. 4th St., Fort Pierce, Fla., secretary.

Ridge Veterinary Medical Association, the fourth Thursday of each month in Bartow, Fla. John S. Haromy, Route #1, Box 107-A, Lake Wales, Fla., secretary.

South Florida Veterinary Society, the third Wednesday of each month. Time and place specified monthly. Joe B. O'Quinn, 1690 E. 4th, Hialeah, Fla., secretary.

Suwanee Valley Veterinary Association, the fourth Tuesday of each month, Hotel Thomas, Gainesville. G. L. Burch, P.O. Box 405, Ocala, Fla., secretary-treasurer.

Volusia County Veterinary Medical Association, the fourth Thursday of each month. Robert E. Cope, 127 E. Mason, Daytona Beach, Fla., secretary.

GEORGIA—Atlanta Veterinary Medical Society, the third Thursday of each month at the Elk's Home, 726 Peachtree St., Atlanta. Clare L. Bromley, 634 Northside Dr., N.W., Atlanta, Ga., secretary.

Georgia-Carolina Veterinary Medical Association, the second Monday of each month at 8:00 p.m., at the Town Tavern, Augusta, Ga. J. A. Schmitz, 1711 Gwinnett St., Augusta, Ga., secretary.

North Georgia Veterinary Medical Association, quarterly, no set date, the spring meeting at the Veterinary School, Athens, Ga. S. J. Shirley, Commerce, Ga., secretary.

Southeast Georgia Veterinary Medical Association, quarterly, date and meeting place varies. Hugh F. Arundel, P.O. Box 153, Statesboro, Ga., secretary.

South Georgia Veterinary Medical Association, the second Sunday of each quarter at 3:30 p.m., at the Radium Springs Hotel, Albany, Ga. M. W. Hale, Route 2, Tifton, Ga., secretary.

ILLINOIS—Central Illinois Veterinary Medical Association, June 9, Sept. 9, and Dec. 10, 1959. Paul B. Doby, 4 Owens Lane, Springfield, secretary.

Chicago Veterinary Medical Association, the second Tuesday of each month, Charles H. Armstrong, 1021 Davis St., Evanston, secretary.

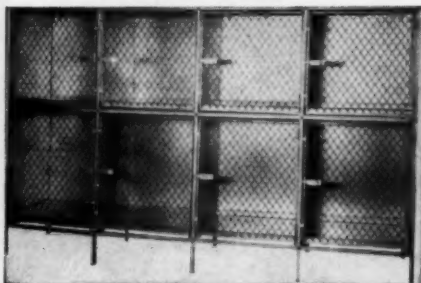
INDIANA—Calumet Area Veterinary Medical Association, the first Thursday of each month. Bruce Sharp, Box 166, Hobart, Ind., secretary-treasurer.

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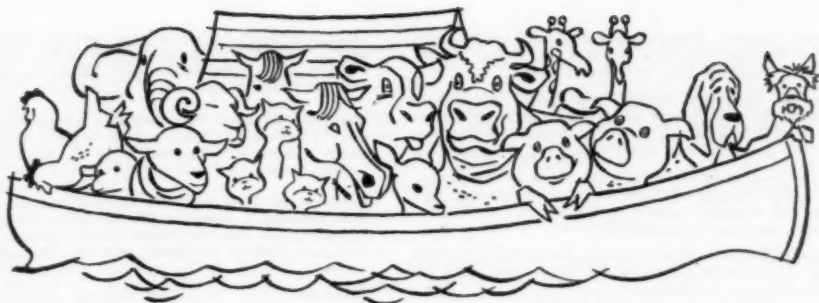


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1. Barr, F.S., Carman, P.E. and Harris, J.R.: Synergism and Antagonism in Antibiotic Combinations; Antibiotics and Chemotherapy; 4:818 (1954).
2. Baker, W.L.: Clinical Use of Injectable Neomycin and Polymyxin B; Veterinary Medicine, 53 (1958): 275.
3. Barr, F.S., Harris, J.R. and Carman, P.E.: Intramuscular Treatment of Staphylococcal Mastitis with Neomycin Sulfate and Polymyxin B Sulfate; J.A.V.M.A., 132 (1958): 110.



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Tenth District Veterinary Medical Association, the third Thursday of each month. J. S. Baker, P.O. Box 52, Pendleton, Ind., secretary.

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Spring Ave., St. Louis, Mo., at 8 p.m. Edwin E. Epstein, 4877 Natural Bridge Ave., St. Louis 15, Mo., secretary.

Kansas City Veterinary Medical Association and Kansas City Small Animal Hospital Association, the third Thursday of each month at the Hotel President, Kansas City, Mo. Robert E. Guilfoil, 18 N. 2nd St., Kansas City 18, Kan., secretary.

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Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 50 University Ave., Rochester, N. Y., secretary.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel, Greensboro. C. G. Sims, 550 Battleground Ave., Greensboro, N. Car., secretary.

Eastern North Carolina Veterinary Medical Association, the last Tuesday evening of each month, time and place specified monthly. Byron H. Brow, Box 453, Goldsboro, N. Car., secretary-treasurer.

Piedmont Veterinary Medical Association, the last Friday of each month. J. G. Martin, Boone, N. Car., secretary.

Twin Carolinas Veterinary Medical Association, the third Friday of each month at Orange Bowl Restaurant, Rockingham, N. Car., at 7:30 p.m. J. E. Currie, 690 N. Leak St., Southern Pines, N. Car., secretary.

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OHIO—Cincinnati Veterinary Medical Association, the third Tuesday of every month at Shuller's Wigwam, 6210 Hamilton Ave., at North Bend Road. G. C. Lewis, 451 E. Galbraith Rd., Cincinnati, Ohio, secretary-treasurer.

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Tri-County Veterinary Medical Association, the fourth Wednesday of January, May, and September. Mrs. R. Slusher, Mason, Ohio, secretary-treasurer.

OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month, 7:30 p.m., Patrick's Foods Cafe, 1016 N.W. 23rd St., Oklahoma City. Claude A. Tigert, 3032 N.W. 68th St., Oklahoma City, Okla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month at the City-County Health Building, 4616 E. 15th St., Tulsa, Okla. Arlen D. Hill, 5302 E. 11th St., Tulsa, Okla., secretary.

Tulsa Association of Small Animal Veterinarians, first and third Mondays. City-County Health Dept. T. E. Messler, 3104 E. 51st St., Tulsa, Okla., secretary.

OREGON—Portland Veterinary Medical Association, the second Tuesday of each month, at 7:30 p.m. Ireland's Restaurant, Lloyds, 718 N.E. 12th Ave., Portland. Donald L. Moyer, 8415 S.E. McLoughlin Blvd., Portland 2, Ore., secretary.

Willamette Veterinary Medical Association, the third Tuesday of each month, except July and August, at the Marion Hotel, Salem. Robert J. Mallorie, P.O. Box 155, Silverton, Ore., secretary.

PENNSYLVANIA—Keystone Veterinary Medical Association, the fourth Wednesday of each month at the University of Pennsylvania School of Veterinary Medicine. Raymond C. Snyder, N.E. Corner 47th St. and Hazel Ave., Philadelphia 43, Pa., secretary.

Lehigh Valley Veterinary Medical Association, the first Thursday of each month. Stewart Rockwell, 10th and Chestnut Sts., Emmaus, Pa., secretary.

Pennsylvania Northern Tier Veterinary Medical Association, the third Wednesday of each odd numbered month. R. L. Michel, Troy, Pa., secretary.

SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

Georgia-Carolina Veterinary Medical Association—
see GEORGIA.

TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month. Jack E. Habluetzel, Route 1, Box 65-N, Ingleside, Texas, secretary.

Dallas County Veterinary Medical Association, the first Tuesday of each month at 7:30 p.m., at a place to be specified. Frank N. Black, 12830 Preston Rd., Dallas, Texas, corresponding secretary.

UTAH—Salt Lake Small Animal Hospital Association, the first Monday of every month, at the Holiday Inn, 3040 South State St., Salt Lake City, at 12:15 p.m. Douglas H. McKelvie, 1220 S. State St., Salt Lake City, Utah, secretary-treasurer.

VIRGINIA—Central Virginia Veterinary Association, the second Thursday of each month at 8:00 p.m., except July and August, at a place in Richmond to be announced monthly. Edwin M. Crawford, secretary-treasurer.

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Northern Virginia Veterinary Society, the second Wednesday of every third month. Meeting place announced by letter. H. C. Newman, Box 145, Merrifield, secretary.

Southwest Virginia Veterinary Medical Association, the first Thursday of each month. D. F. Watson, Blacksburg, secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Monday of each month, Magnolia American Legion Hall, 2870 32nd W., Seattle. Roy C. Toole, 18415 Main St., Bellevue, secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. B. D. Benedictson, 3712 Plummer St., Olympia, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the third Thursday of each month in the Hotel Pritchard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St., W. Huntington, W. Va., secretary.

WISCONSIN—Central Wisconsin Veterinary Medical Association, the second Tuesday of each quarter (March, June, Sept., Dec.) C. R. Carlson, 1169 E. LaSalle Ave., Barron, Wis., secretary.

Coulee Region Veterinary Medical Association, the third Wednesday of every other month. F. N. Petersen, Box 127, Cashton, Wis., secretary.

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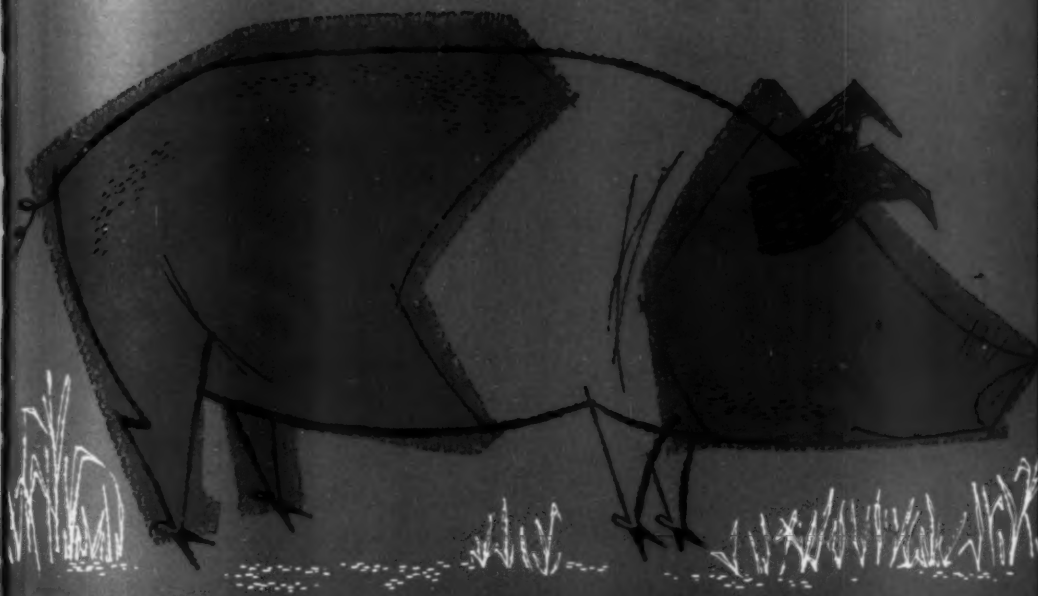
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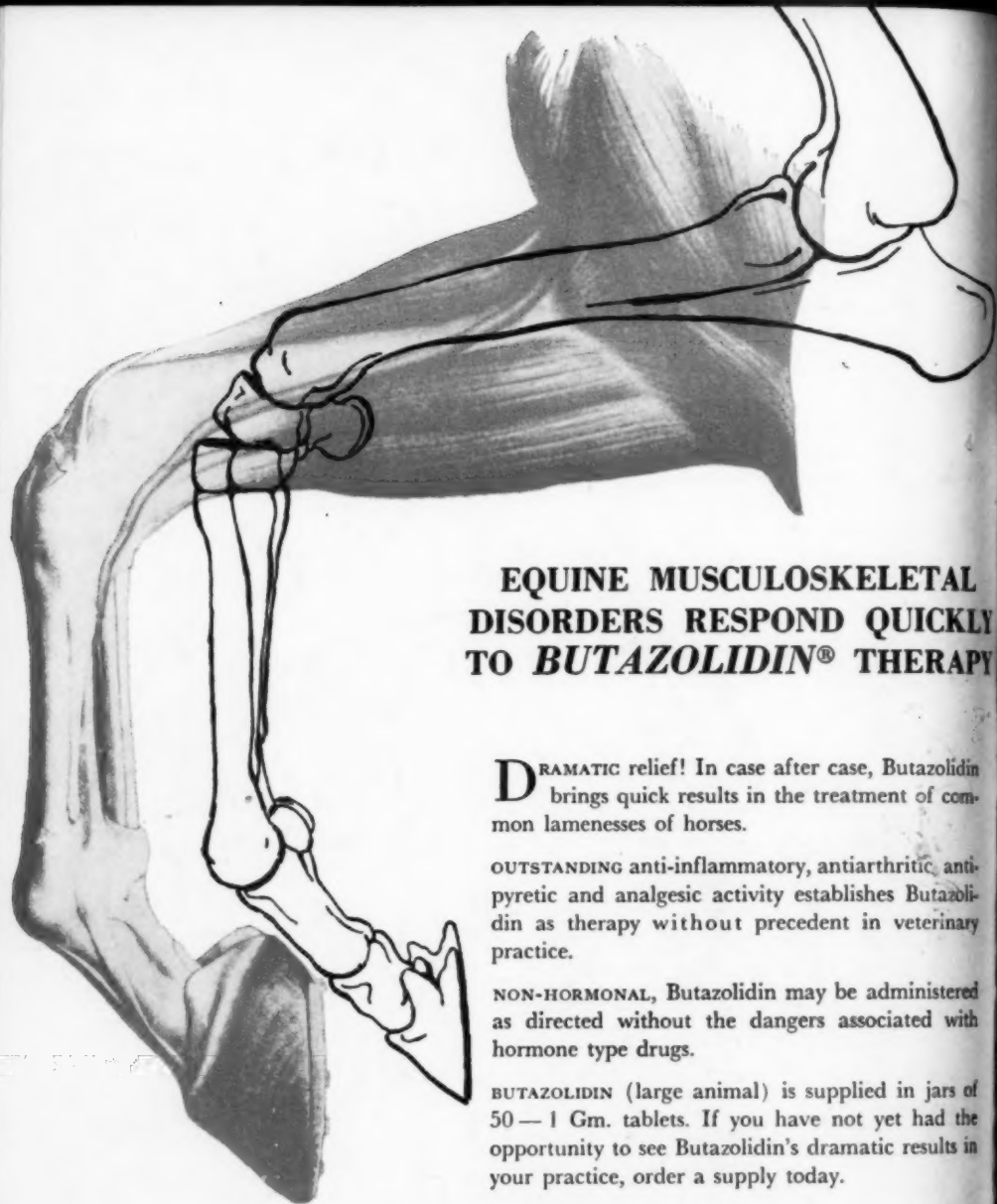
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BUTAZOLIDIN (large animal) is supplied in jars of 50 — 1 Gm. tablets. If you have not yet had the opportunity to see Butazolidin's dramatic results in your practice, order a supply today.



Jensen-Salsbery Laboratories, Inc.
Kansas City, Missouri

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